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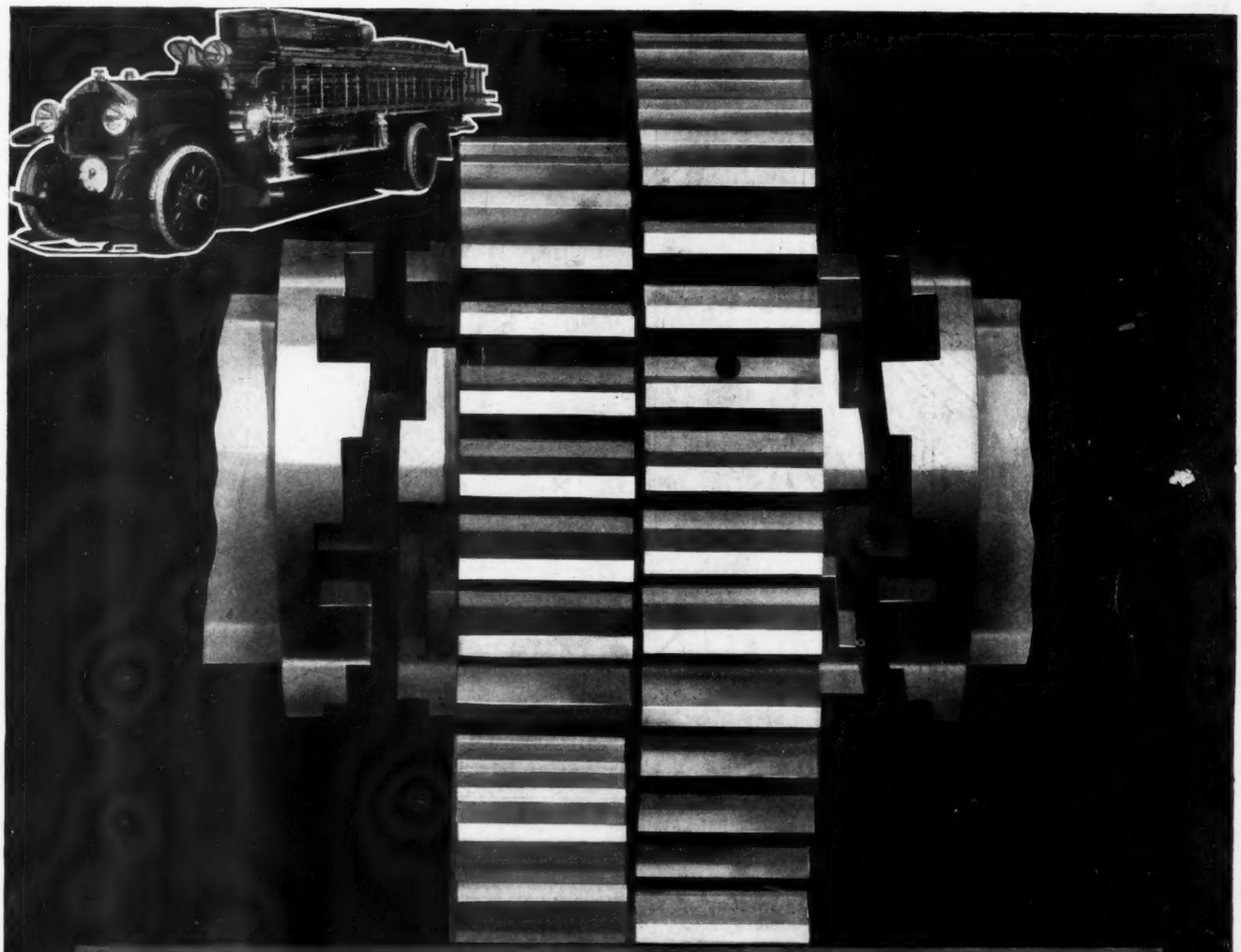

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AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

VOL. XLI NEW YORK—THURSDAY, AUGUST 14, 1919—CHICAGO NO. 7

Single Government Department for All Aeronautics Urged by Mission

Industry Created by War Fast Disappearing, Declares Report—Would Have Agency Equal to War Department—Asks Government to Stop Design of Planes and Engines—Urges Prompt Establishment of Federal and International Law

By Allen Sinsheimer

WASHINGTON, August 13.

THE establishment of a single government agency equal in importance to the Departments of War and Commerce, and to be called the National Air Service is urged by the American Aviation Mission which headed by Benedict Crowell, Assistant Secretary of War, has been studying European aeronautics. While the American aircraft industry has been fast disappearing, states the report, England, France and Italy by co-ordinating their aeronautic bureaus have developed their industries. The United States, it is declared, must aid American aircraft makers and can best do so by co-ordinating the military, naval, postal and civil aeronautics under a single head.

The Mission, which has conferred with the highest British, French and Italian authorities and visited the chief plants in each country, was formed by Crowell as a result of his studies of the aeronautic situation in this country. The membership of the Mission was drawn from the Army, Navy and the aircraft industry. The mission was abroad six weeks and returned to this country July 19. The members were pledged to secrecy as to the report, which was transmitted to Secretary of War Baker.

In opposition to this view, Newton D. Baker, Secretary of War, issued a statement with the report advocating governmental aid for the aviation industry but stating that the Mission "went too far" in suggesting a single centralized air service.

Abolition of airplane design by the government is urged in the statement which characterizes government designing as competition with industry that is harmful to the development of aviation and to the workers and manufacturers. A standardized method of payment is asked which no doubt is intended to clear up the confusion that now exists when makers are asked to produce planes of new design, costing considerably above the usual estimates because of experiment, engineering and so forth.

The department as recommended would include a Secretary, Assistant Secretary, several bureaus, and

an advisory council comprising the Secretary, Assistant Secretary and bureau chiefs.

The bureaus would include those acting for military, naval, and civil affairs, together with a technical division which would have control of research, experiment and development, dissemination of aeronautical data, inspection of aircraft for air-worthiness, tests of fields, marking standards and so forth. The civil aeronautic bureau is to control licenses for pilots, establish routes, publish maps, aid states and cities to establish fields, develop meteorology, formulate federal laws and so forth.

Following is the complete report:

To the Secretary of War.

SIR: In accordance with your instructions, the American Aviation Mission visited France, Italy and England. It was able to confer with various ministers of these Governments, ranking Army and Navy Commanders, and the foremost aircraft manufacturers.

A thorough study and investigation was made by your Mission of all forms of organization, production and development. As a result of these studies, your Mission desires to emphasize the universal opinion of its members that immediate action is necessary to safeguard the air interests of the United States, to preserve for the Government some benefit of the great aviation expenditures made during the period of the war, and to prevent a vitally necessary industry from entirely disappearing. Ninety per cent of the industry created during the war has been liquidated. Unless some definite policy is adopted by the Government, it is inevitable that the remaining ten per cent will also disappear.

THE MISSION FINDS:

The American aeronautic industry is fast disappearing, ninety per cent having been liquidated since the signing of the Armistice.

England, France and Italy have recognized the tremendous importance of civil aviation both in commerce and as a potential war-time defense.

That the speed and range of aircraft demand international agreements, and that laws, regulations and agreements covering aircraft navigation are as necessary as those for steamship and rail travel.

That federal laws for aviation in this country must be made promptly to avoid the confusion that will arise if individual states are allowed to pass the legislation.

In placing this matter before you the subject falls into three important heads:

(1) General organization
(2) Development, commercial
(3) Development, technical

The findings of the American Aviation Mission and its recommendations are submitted after a careful review of the situation in the allied countries mentioned, but always keeping in mind the situation in the United States. Under the above sub-heads the results of these investigations are presented to you, which, in the opinion of the Mission, demand the most earnest and immediate consideration along the broadest lines, with a view to establishing some fixed policy which will save the aircraft situation in the United States and give the United States an equal place with the great powers of Europe in this great new commercial development.

The American Aviation Mission therefore recommends: The concentration of the air activities of the United States, military, naval and civilian, within the direction of a single Government agency created for the purpose, coequal in importance with the Departments of War, Navy and of Commerce, to be called in this report, for purposes of identification, the National Air Service.

In making the above recommendations, the following views and data of the Mission are presented:

Visits were made by the Mission to England, France, Italy, and conferences have been held with those largely responsible for the successful prosecution of the war and especially with those men most experienced in the aerial development within those countries. Among others, interviews have been had with:

France

Marechal Foch, Commandant-en-Chef des Armees Alliees.
Mr. Andre Tardieu, Ministre des Affaires Franco-Americaines.
General M. Duval, Chef de Service de l'Aeronautique.
Mr. Jacques Dumesnil, Deputé, formerly Sous-Secretaire de l'Aeronautique.
Mr. Loucheur, President du Conseil de Guerre, now Minister of Reconstruction.
Mr. Daniel Vincent, Depute, ex-Under Secretaire for Aviation.
Mr. Gaston Menier, Depute, Chef du Comite Aeronautique au Senat.
Major d'Aiguillon, Commission Interministerielle de l'Aviation civile.

England

Honorable Winston Churchill, M. P., Secretary of State for War and Secretary of State for Air.
Field Marshal Sir Douglas Haig, Commander in Chief of the British Army.
Admiral Sir David Beatty, R. N., Admiral of the Fleet.
Major General Right Hon. J. E. B. Seely, Under Secretary of State for Air.
Major General Hugh M. Trenchard, Chief of Air Staff, Royal Air Force.
Major General E. L. Ellington, Director General, Supply and Research, Royal Air Force.
Major General Sir Frederick H. Sykes, Controller General Civil Aviation, Royal Air Force.
Sir W. A. Robinson, Secretary, Air Ministry.
Major General Sir W. S. Brancker, Royal Air Force (now with the Aircraft Manufacturing Co., Ltd.).

Italy

Signor G. Grassi, Chief of the Italian Aviation Mission in Paris.
Colonel Guidoni, Italian Foreign Aeronautical Mission.
Admiral Orsini, Chief of Italian Naval Aviation.
Colonel Crocco, Chief of the Technical Bureau.
Signor Conti, Secretary of State for Aviation.

In all countries visited, and in the minds of all persons met in conference appears an extraordinary similarity in condition and in conclusions drawn from the experiences of the five difficult years of mistake and achievement in the prosecution of the war. Perhaps no stronger or more simple presentation of the regard in which the future of aviation is held in allied countries can be given than by quotation from two letters of M. Clemenceau, copies of which were obtained in France. The first is addressed to the President of the United States, urging upon him the immediate consideration of matters aeronautical and in connection with the Peace Conference. The second is addressed to the President of the Republic of France, submitting the draft of a decree creating a separate depart-

ment of aeronautics placed transitorily under the Ministry of War—an intermediate step possible without legislation and looking to the early creation of an Independent Ministry of the Air:

COPY

February 16, 1919.

The President of the Council, and
The President of the Interallied Peace Conference.
To the President of the Republic of the United States.
Interallied Aviation Committee:
Mr. President:

I have the honor to acknowledge the receipt of your answer of February 7, to my letter of January 24. I enclose herewith copies of the letters which I have received from Lord Milner and from Monsieur Orlando, as well as my replies.

I am pleased to note that you agree in principle with my proposition to create an Aviation Committee for after the war. I take the liberty of insisting on the necessity of creating this Committee without delay, in order to be able to utilize it as an advisory organ for the Peace Conference. Indeed, the clauses for aerial protection seem to me to have at least an importance equal to the clauses for military and naval protection; and it is of the greatest interest to have a study made by competent personalities of the measures to be taken against the eventual constitution of a German military fleet. I cannot insist too strongly on the imperious necessity of this study, on account of the proximity of Germany to London, Brussels, Paris and Rome.

Likewise, I adhere entirely to the British proposition which seems to me practical and effective, and I request you likewise to give it attention. In case it seems acceptable to you, I wish you would let me know if you could delegate two representatives to the next meeting of the new Interallied Committee, which will take place on Thursday, March 6, at ten o'clock, at the Directory of Aeronautics, 260 Boulevard St. Germain.

Please accept, Mr. President, the assurance of my highest consideration, etc.

(Signed) CLEMENCEAU.

SUGGESTED PRACTICE

That design of planes and engines by the government bureaus constitutes a serious and harmful competition of government against industry.

That a standard method of payment for planes and engines is essential to clarify the expenses and confusion entailed in design, experiment and development of planes for government consumption.

That the industry must be given governmental assistance and that, until the risks and hazards are completely overcome, government must carry the load.

COPY

REPORT TO THE PRESIDENT OF THE FRENCH REPUBLIC

Mr. President: Paris, June 6, 1919.

Aircraft has developed considerably during the war. It should at this time adapt itself to a no less important part in peace time. But because of the many initiatives which cooperate in its new use and development, the efforts and means are dispersed in various ministerial departments.

The future of aviation in France will only be assured by the co-ordination of all efforts and the unification of the general services. Also, it will give the advantage of better work from the personnel and credits which are actually effected to similar objects in different ministries.

With this object in view, and according to the propositions of an interministerial conference which I am able to assemble, I have the honor to submit for your signature the following decree creating an organ of general co-ordination of aviation.

This should not be confused with any of the particular aviations of the various ministerial departments. At its origin, it will be attached transitorily to the Ministry of War.

I am, Sir, yours respectfully,
GEORGES CLEMENCEAU,
President of the Council, War Ministry.

Even before the report of this mission can be given consideration, a step similar to that proposed by France will have been taken by Italy. Here, however, the Department of Aeronautics is being placed under the Ministry of Transportation—a makeshift arrangement frankly acknowledged transitory and immediately possible without the legislation needed to create the clearly foreseen ultimate—the Italian Ministry of Air.

England more than two years ago began the co-ordination of her aircraft activities—an effort which has resulted in placing her well in the lead in practically every phase of aerial development and which has resulted in bringing her months ago to the establishment of a Ministry of Air, co-equal with her Ministries of War and of the Navy. That the present ministries both for war and for air are centered in the same individual has no significance other than that of momentary expediency.

The whole trend of events touching the art of aeronautics in its broad relation to world progress, the experience in all Allied countries (including the United States) during the five years past, the frankly discussed future plans under present consideration in foreign quarters and the views everywhere encountered by us, leave your mission impressed with these unescapable conclusions:

1. That Italy, France and England realize fully the importance of aircraft in the military-naval and civil-commercial aspects and propose to encourage the general development of the art through governmental aid to commercial industry.

2. That Great Britain has come to consider the dominance of the air as at least of equal importance with that of the seas, and is frankly and avowedly planning a definite policy of aerial development to that end.

3. That any future war will inevitably open with great aerial activity far in advance of contact either upon land or sea, and that victory cannot but incline to that belligerent able to first achieve and later maintain its supremacy in the air.

4. That for economic reasons, no nation can hope in time of peace to maintain air forces adequate to its defensive need except through the creation of a great reserve in personnel, material and producing industry through the encouragement of civil aeronautics. Commercial aviation and transportation development must be made to carry the financial load.

5. That no sudden creation of aerial equipment to meet a national emergency already at hand is possible. It has been proven within the experience of every nation engaged in the war that two years or more of high pressure effort have been needed to achieve the quantity production of aircraft, aircraft engines and accessory equipment. The training of personnel, including engineering, production, inspection, maintenance and operating forces—covering some fifty distinct trades and some seventy-five industries—has proved in itself a stupendous task when undertaken upon the basis of the war emergency alone.

6. That the rapid adaptation of aircraft to the commercial uses of peace is everywhere being studied and planned. Under the forced draft of war, this newest and fastest

agency of transportation has been brought to a high state of development. It must now be redesigned to meet the progressive demands of a civilization at peace.

7. That, because of its great speed and range of operation, oceans, states and even countries are being passed over with a greater facility than are townships and counties traversed by the motor car. The need for international agreements governing the construction, operation and safety of aerial apparatus of all kinds is immediately before us.

8. That for the first time in the world's history, the stage is set for a close international co-operation in the development of a great art at the very threshold of its era of commercial utility. Great Britain, France, Italy and Japan not only invite but urge the United States to share in this work.

9. That just as we now have national, international and interstate regulations, laws and agreements covering rail and steamship travel, and the safety and navigation of the seas, so must we have similar regulations governing aircraft and the uses of aerial navigation throughout the world. The International Convention drawn by the International Committee sitting in Paris, under the Peace Conference, gives the first long step in this direction.

10. That the need in each country for a single authoritative point of contact for the conduct of all international aviation affairs, legal, operational, technical and political, is imperative. Such agencies have already been set up in England, France and Italy. The United States has under the terms of the International Convention no option but to follow these leads.

11. That in England, France and Italy sentiment is undoubtedly in favor of the centralization of aircraft development under one authoritative head. Difference of opinion has been encountered only in the matter of army and navy personnel and in the question of the independent fighting force.

England holds the initiative and is building her Royal Air Force co-equal with the army and navy. France and Italy follow England's lead, but seem inclined to leave questions of operating personnel for the present to War and Navy Departments and to debate the need of an independent fighting air service. In all cases, forces operating in conjunction with military and naval units function under the military or naval high commands.

12. That among the many considerations of early moment requiring governmental direction may be mentioned the following:

(a) Federal and international laws governing the use of air routes.
(b) Federal and international control of pilots' licenses; examination and tests required.
(c) Federal inspection of all commercial aircraft for airworthiness, or suitability for service.
(d) Customs and other regulations for crossing state and national boundaries.
(e) International standards for methods of communication and signaling.
(f) International standards covering the marking or charting of air routes and of landing places for both day and night use.
(g) International specifications and rules governing the construction, equipment and operation of standard airdromes, landing stations, signal towers and other aids to aerial navigation.
(h) Port regulations and fees covering seaplanes.
(i) Federal taxation of aircraft and license for its use.
(j) Safety measures and devices; legislation forcing adoption.
(k) Fire underwriter standards, regulations and safeguards. insurance of machines, of material and of persons in transit (property and life).
(l) The legal status of privately owned aircraft; the property rights of the air; liability for damage inflicted and incurred.
(m) International standards and specifications covering accepted practice in quality of materials, in factors of safety, and in methods of construction; an engineering literature of this new art must be created by international approval.
(n) Maps and navigation charts of the United States and its territories.

13. That we of to-day are conceivably no more qualified to judge as to the scale and development of the aircraft of ten years hence than were we of even five years ago able to foretell the achievements of to-day. We must bear in mind always that for every one mind focused upon things aeronautical in this earlier period, some thousands of keen minds are now versed in the aircraft art. With proper governmental encouragement, rapid progress seems inevitable.

14. That the broadest consideration of the ultimate welfare of American aviation must be given in the constitution of any organization set up for the co-ordination and control of aeronautics within the United States. The prerogatives and ambitions of governmental departments and of individuals must be assayed at true value.

15. That past experience and every economic consideration point to the vital need for the formulation by the United States of a definite, comprehensive and continuing policy for the development of every phase of the aircraft art. Our Government is now faced with the task of nursing and actively encouraging a new transportation industry, whose healthy growth is vital to the future progress and defense of the nation.

Because of the lack of a definite, intelligent and sympathetic policy in our governmental aircraft organization since the armistice, our American aeronautical industry, built up at such great expense of money and of effort, is rapidly disappearing. No sensible business man is justified in keeping money invested in the aircraft industry under the conditions which have maintained in the United States since Nov. 11.

16. That the closest possible relations must continually exist between the aircraft agency of the Government and the production and commercial industry engaged in aircraft development.

17. That the industries involved in the production and

THE MISSION RECOMMENDS

The establishment of a single government agency to control all aeronautics.

A single executive, ranking as a Secretary and placed in the Presidential Cabinet, to have charge of the department.

Co-ordination of military, naval and civil aviation, together with supply and research, under the department.

An air council of an advisory character comprising the Secretary and bureau heads.

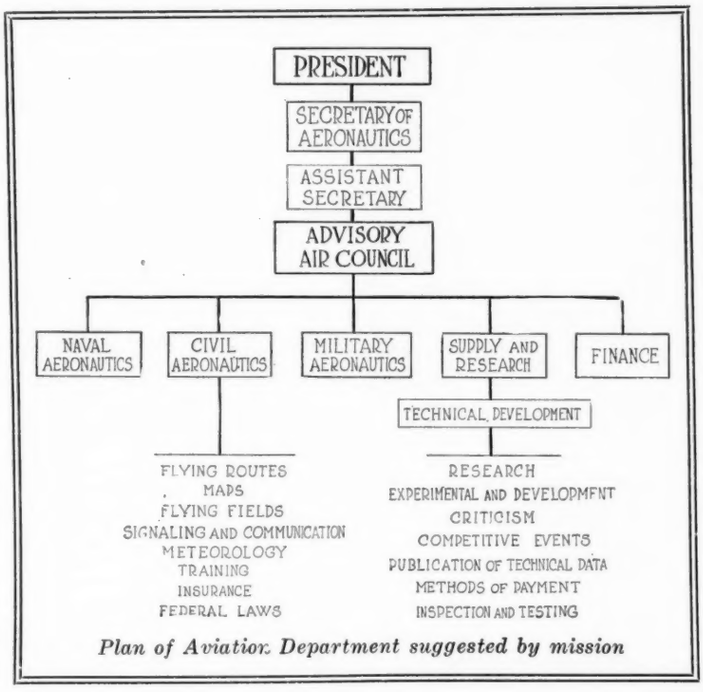
A Civil Aeronautics Division to control training, license of pilots, insurance, etc.

A Technical Division to control research, experiments, development, testing and inspection of planes for air-worthiness and fields for safety, etc., etc.

commercial use of aircraft must be given recognition and representation in connection with all national and international activities bearing upon the direction and control of aeronautics.

In the foregoing brief presentation of its conclusions, your mission has touched upon the aeronautical policies already in effect or under present discussion in England, France and Italy. Great Britain's plan of organization certainly warrants our most careful consideration. Its salient points are clearly set forth in the chart herewith attached. It is not argued that the British method is perfect, but it can be stated without fear of contradiction in any quarter that it stands to-day the most comprehensive governmental mechanism yet set up by any nation in the world for the encouragement, upbuilding, direction and control of its air resources. This organization has been born of five bitter years of trial, mistake, experience and progress. It is the product of the best brains in the British Empire focussed under the spur of national need and the demand of the British people. We in America may well study it carefully.

Your Mission, in presenting its recommendations, desires to emphasize the view everywhere encountered that the future of aerial navigation and of aerial development generally is in only a limited sense a function of military and naval establishments. The air is a medium for commerce and communication and its direction to the peaceful uses of civilization must be unhampered by the necessarily restrictive views of these specialized departments.



Plan of Aviation Department suggested by mission

RECOMMENDATIONS

A. The concentration of the air activities of the United States, civilian, naval and military, within the direction of a single governmental agency, created for the purpose coequal in importance and in representation with the Departments of the War, Navy and of Commerce.

B. That the agency thus created be charged with full responsibility for placing and maintaining our country in the front rank among nations, in the development and utilization of aircraft for the national security, and in the advancement of the civil aerial transportation and communication arts.

C. That this governmental organization be formed in general as follows:

1st. A civilian secretary for air.
2nd. An assistant secretary, a civilian, responsible directly to the Secretary for Air for the management and operation of the department.
3rd. Five or more divisional heads acting as chief of the sub-departments of (a) Civil Aeronautics, (b) Military Aeronautics, (c) Naval Aeronautics, (d) Supply and Research, (e) Finance, etc.
4th. An Air Council, advisory in character, which shall be constituted by the Secretary for Air, including the Assistant Secretary for Air, the chiefs of the several sub-departments and such other personnel as may be deemed advisable.

We desire especially to invite attention to the complexity and newness of the whole development of the aviation art, and to urge the broadest possible treatment of the subject during this formative period. We suggest that the lesser details of organization may well be left to the judgment and initiative of those called to assume the responsibility of directing this work. We desire also, in this connection, to call attention to the aircraft interests of the Allied Governments, and to emphasize the necessity for careful discrimination in the selection of men of industrial experience and broad vision.

D. The establishment of governmental institutions of education and training, including an air college, all open alike under proper restriction, to military, civilian and naval personnel.

E. Such curricula and such arrangement of promotion in the National Air Service, and such assignment and pay as to insure to the young man an attractive career whether he elect to remain permanently in the "National Air Service" or return to army or navy, or to civil life.

F. The adoption of a system whereby army, navy and civil personnel can be circulated in proper proportion through the National Air Service. This personnel would, unless permanently assigned to air work, be automatically returned to the military and naval sources, or to civil life as an air service reserve after the educational and service periods in the National Air Service have expired.

It is felt that such a circulating system is vital to the co-ordination and ultimate efficiency of the three services, and to the desired dissemination of a knowledge of and interest in the air among our people. The young officers of to-day will command the military and naval forces of to-morrow, and will carry with them into the highest ranks an intimate knowledge of aircraft, and of the strategy of its varied uses, in connection with operations on land or sea.

The direction of civilian and commercial activities of all kinds will be made possible, and the closest contact and co-operation between the Government and the aeronautical industries assured.

All international relations touching aerial matters fall naturally within the jurisdiction of the Secretary for Air.

All responsibility for the supply of aircraft material and equipment of all kinds, and for the training of personnel for all branches of the service is, in accordance with these recommendations of your Mission, placed with the Secretary for Air. As some twenty-seven thousand items are involved in the equipment and maintenance of each air squadron on active duty, the need for a single responsible direction seems undebatable.

Under this plan of organization here recommended, all squadrons and all equipment assigned by the National Air Service to meet the stated requirement of the military and naval establishments pass automatically under army and navy command. Under National Air Service operational

direction remain only those independent projects unrelated to the activities of the military and naval fighting fronts and such personnel and equipment as forms a surplus to the needs of the sea and land fighting arms.

The question of governmental organization for the development and utilization of our country's air resources has been given consideration by your Mission, seemingly from every angle. The recommendations made are general. No report could be made effective, if burdened with the mass of details involved in the setting up of any governmental mechanism such as proposed.

There have been, and will continue to be advanced many objections to the establishment of a Department of the Air. We believe none of them will prove insurmountable. We believe the advantage gained to be such as to entirely overshadow any temporary difficulties.

Always in the past, in war by land or by sea, and in the transportation activities of peace, we have thought in two dimensions only. We must now readjust our minds to think for all future time in three.

When this mission left the United States in May, its members were hoping the Atlantic Ocean might be crossed before Jan. 1, 1920. Within the two months of our absence, four successful crossings have been made and without the loss of a single life.

There must be no over-optimism. There are years of development and experimentation ahead. As in the case of all the other great agencies of civilization, the commercial and financially profitable use will come slowly. But here the immediate welfare and safety of our nation is involved and an intelligent and efficient direction of our aeronautical affairs will be demanded by the American people. American genius has given to the world the airplane, a new instrument of commerce and of war. But America has left its development to other nations, and, too late, realized the mistake of this neglect. She has paid the price! America now again has the opportunity, if not to lead, at least to take her place in the front rank and to gain to herself the full benefit which will surely accrue from an active and sincere co-operation in the engineering activities, and in the scientific and commercial aircraft developments of those nations associated with us in the war.

But this will be impossible, in the future as in the past, if our aircraft activities remain dispersed among the several governmental departments and impossible of coordination for decisive action.

Upon the breadth of view and the vision of those in control of America's policies depends our future as an air power.

Commercial Development

With reference to the commercial development of aviation your mission makes its recommendation based upon the following conclusions which have been formed, first, through knowledge of conditions existing at present in America, and second, the knowledge gained by its investigations abroad.

The investigations in England included visits to a number of factories, airdromes and other points of particular interest, and interviews with the following gentlemen:

England

Major General Hugh M. Trenchard, K.C.B., D.S.C., Chief of Staff, Air Ministry.
Major General Sir Frederick H. Sykes, K.C.B., C.M.G., Controller General, Civil Aviation.
Major General E. L. Ellington, C.B., C.M.G., C.B.E., Director General Supply and Research.
General Huggins.
Mr. Douglas Vickers, Vickers Co., Ltd.
Captain P. D. Ackland, Vickers Co., Ltd.
Sir Percy Gerouard, Armstrong, Whitworth & Co.
Sir Samuel Waring, of Waring & Gillow, who is also interested in five other aeronautical companies in England.
Mr. Holt Thomas, Aircraft Manufacturing Company.
General Sir W. S. Brancker, K.C.B., D.F.C., Aircraft Manufacturing Co.
Mr. White Smith, British and Colonial Airplane Co.
Mr. J. A. Taylor, Cosmos Engineering Co.
Mr. Fadden, Cosmos Engineering Co.
Mr. Handley Page, Handley Page Co., Ltd.
Mr. Grahame White, Grahame White Co.
Mr. C. V. Allen, Secretary of the Society of British Aircraft Constructors.
Mr. Leslie P. Langton, Black and Manson Insurance Underwriters, who have specialized in aircraft insurance.

Factories of the following companies, engaged in the manufacture of airplanes and motors, were visited:

Members of the mission also visited the airship factory of Armstrong, Whitworth & Co., located at Selby, and the dirigible airdrome of the British Navy located at Pulham, where they examined the R-33, which is a replica of the R-34, and several smaller airships.

The mission's investigation in France included visits to a number of French factories and flying fields, and interviews with the following gentlemen:

France

General M. Duval, Directeur du Service Aeronautique.
Senateur Gaston Menier, Chairman of the Comite Aeronautique au Senat.
Mr. Pierre Etienne Flandin, Deputy, and former Chief of the Organe Interallie a L'Aeronatique.
Commandant d'Aiguillon, of the Commission Interministerielle de l'Aviation Civile.
Commandant de St. Quentin, Chief of the Service de Fabrication de l'Aviation.
Mr. Louis Breguet, of the Breguet Co. and Compagnie des Messageries Aeriennes.
Mr. Bleriot, of the Bleriot Co.
Mr. Maurice Leblanc, Bleriot Spad Co
Mr. Kapherer, of the Societe Astru.
Mr. Bazaine, of the Societe Nieuport.
Mr. Maurice Farman, of the M. & H. Farman Co.
Mr. Granet, Secretary of the Chambre Syndicale de l'Industrie Aeronautique.
Mr. Esnault-Pelleterie, President of the Chambre Syndicale de l'Industrie Aeronautique.
Lieutenant Rene Fonck, Premier French Ace.
Mr. Maurice de St. Blanchard, Secretary of the Aero Club de France.
Comte de Libersee, former pilot and at present much interested in the development of civil aeronautics in France.

Among the factories visited were:

Morane-Saulnier factory.
Breguet factory.
Bleriot factory.
Farman factory.
Hispano-Suiza factory.
Renault factory.

All of which are engaged in the manufacture of airplanes and motors.

The investigation in Italy included interviews by representatives of the mission with the following gentlemen:

Italy

Signor G. Grassi, Deputy, ex-Chief of the Italian Aeronautical Mission in France.
Colonel Guidoni, Italian Foreign Aeronautical Mission.
Admiral Orsini, Commander of Italian Aviation.
Captain Bursaglia, Chief of Staff to the Minister of Marine.
Signor Peroni, Director of the Ansaldo Co.

Secretary Baker Disapproves of Single Department

WASHINGTON, August 11.

IN making public the report submitted to me by Mr. Crowell and his associates on the American Aviation Mission, I desire to emphasize the thoroughness and value of the studies made in England, France and Italy with regard to the importance of aircraft and the essential dependence of the art for its development upon a sympathetic attitude in the Government. . . .

The Mission has in my judgment gone too far in suggesting a single centralized air service. Army and Navy aviators are specialists in the art; both the airplanes and the pilots needed are of a different type from those needed in civil undertakings. The pilots particularly need to be trained upon a different theory. Military pilots are trained to fight singly or in formation, and to operate in co-ordination with other branches of the military service, so that their training must be military. Their own efficiency and that of the other branches of the service depend upon the most intense and constant associated training, and a separation of the Air Service from the Army or the Navy would require co-ordination of their activities in time of war, whereas effectiveness in military operation rests upon the concentration and singleness of authority, command, and purpose.

The point emphasized by the Mission is the importance of maintaining adequate production facilities in this country. This it is believed can be brought about best by the establishment of a government agency which will lay down the necessary rules, national and international, for aircraft operation, prevent discouraging lack of uniformity in state regulation and generally stimulate private and public enterprise in perfecting and using commercially this mode of transportation, and by centralizing the placing of orders on government account so as to have the incidental effect of making them contribute to the maintenance of aircraft production as an industry. . . Such encouragement as the Government may find it wise to give can be accomplished without sacrificing the science of military aeronautics. The Joint Board of the Army and Navy is already eliminating duplication and producing co-operation in developing the air service of those departments and should Congress decide to extend its aid to the commercial development of aircraft, complete co-operation will be easy in all matters of invention, design, and production where the different aspects of the problem meet on a common ground.

(Signed) NEWTON D. BAKER,
Secretary of War.

Signor Casatti, of the Caproni Co.
Signor Buzio, of the Macchi Co.

Representatives of the mission also visited the following factories in Italy, all of which are engaged in the manufacture of airplanes, balloons and motors:

Pomilio Co.
Ansaldo Co., at Torino.
Caproni Co., at Milan.
Isotta-Fraschini, which was shut down due to a strike.

1. One of the most important problems to be considered in the rehabilitation of the world's commerce, following the close of the war, is the development of aerial transportation for commercial purposes. Its one invaluable service, and that in which it surpasses all other means of transportation, is speed, that time-saving element which the world has always striven for, and for which America, with its great distances, has such serious need. Reliability, safety, economy, and those other qualities of transportation service which are of value, will steadily improve as the use of aircraft increases and experience accumulates.

2. It is as impossible to forecast the future of this new medium of transportation as it would have been to describe the speed, comfort and safety of the modern steamship at the time the first steamship crossed the Atlantic. It is safe to say, however, that in time it will become one of the great transportation mediums of the world and will continue to offer the fastest and most direct means of transportation for persons, mail, and light freight, known to civilization. Its development is limited only by the perfection of the mechanical devices used, with which we are constantly becoming more familiar, and by the extent of our knowledge of the atmosphere which is becoming more thoroughly understood each year.

3. It is equally difficult to determine the speed with which this development will take place. In fact, this will be determined largely by the opportunities afforded to employ the brains of the engineer and the scientist on the problems involved, which in turn will be controlled by the financial resources available for such work. It is thought by some well-informed authorities that the next five or ten years will see this new industry through its initial stages, and established on a self-supporting basis, providing it is encouraged at this time. Adequate support cannot be expected from private enterprise alone, and if no outside aid is given, ten years will probably see this industry in America still struggling for a foothold, and far behind its European competitors, who will receive substantial aid of many kinds.

4. History has shown repeatedly that no nation can afford to neglect the highest possible development of its transportation mediums regardless of the opportunities existing for immediate profit to the private enterprise concerned. This is particularly true of aerial transportation, which is not local in its nature, but which is essentially of

(*Continued on page* 323)

Specially Designed Engine and Axle for Cleveland Car

This new car produced by the Chandler interests will sell for about 50 cents a pound and will carry an individual tire load of about 650 pounds. The price at which it will be offered makes it especially a production job and therefore extremely interesting from that standpoint. It has been highly commended for the selection in engineering and materials.

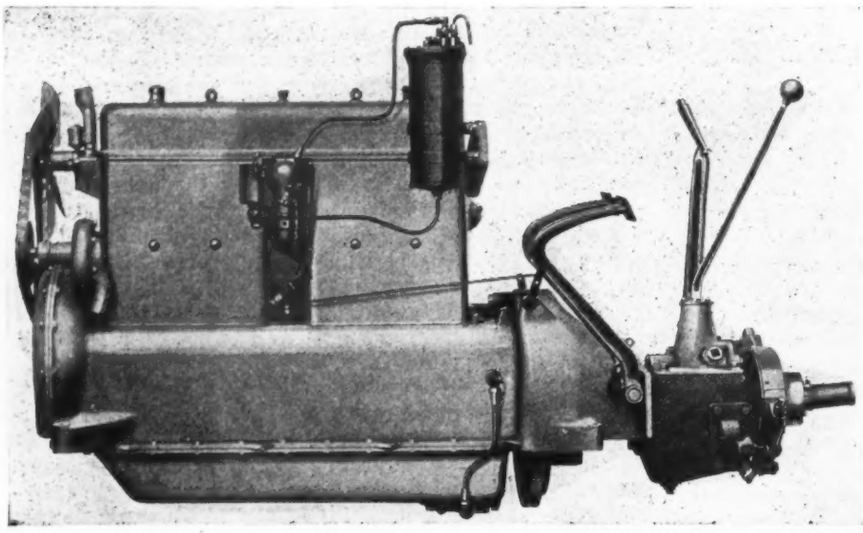
DESIGNED as a complementary product and fathered largely by identical financial interests as the Chandler, the Cleveland car will be merchandised through Chandler dealers. The Cleveland, when put on the drafting board, two years ago, was designed to sell for below $1,000, but has been forced upward in the price scale by the rising cost of material and labor to $1,385. At that price it represents an accomplishment in engineering and material selection. S. A. E. standards have been followed consistently.

Marketing a car with a 3 x 4½ overhead valve six-cylinder engine, 112-in. wheelbase and a five-passenger or three-passenger roadster body below $1,500 entails a fairly heavy production schedule. According to present plans this will be 5,000 before Jan. 1, and 20,000 during the year. The finished car retails slightly over 50 cents per pound, the weight complete being 2600 lb., according to the engineering department. With a tire equipment of 32 by 4 in., or an approximate individual tire load (not counting passenger weight) of 650 lb., a good tire life may be expected, as the S. A. E. standard for 4 in. tires allows a maximum load of 815 lb. per tire.

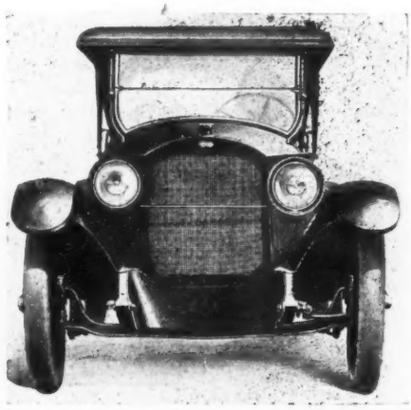
Chandler and Cleveland engineers have designed and are making the engine and axles, otherwise the car is a product of well-known parts makers, including Borg & Beck (clutch), Mechanics Machine Co. (gearset and universals), Parish & Bingham (frame), Gray & Davis (lighting, starting and ignition system). The body is a product of the Fisher Body Co. Besides these structural units, the car is equipped with Ditweiler steering, Firestone rims, Johnson curtain light and VanSicklen speedometer. A Bosch magneto is provided at $45 extra.

The engine follows conventional practice, being a six-cylinder, block cast, overhead valve engine with the camshaft in the crankcase and the valves in line in the head assembly. No complete block tests have as yet been made on this power plant, and output figures are therefore unavailable. With the overhead type of construction, however, valves of 1⅛ in. clear diameter and the combustion chambers in the cylinder casting completely machined, a high mean effective pressure may be expected. The carbureter is a 1 in. Stromberg model MB.

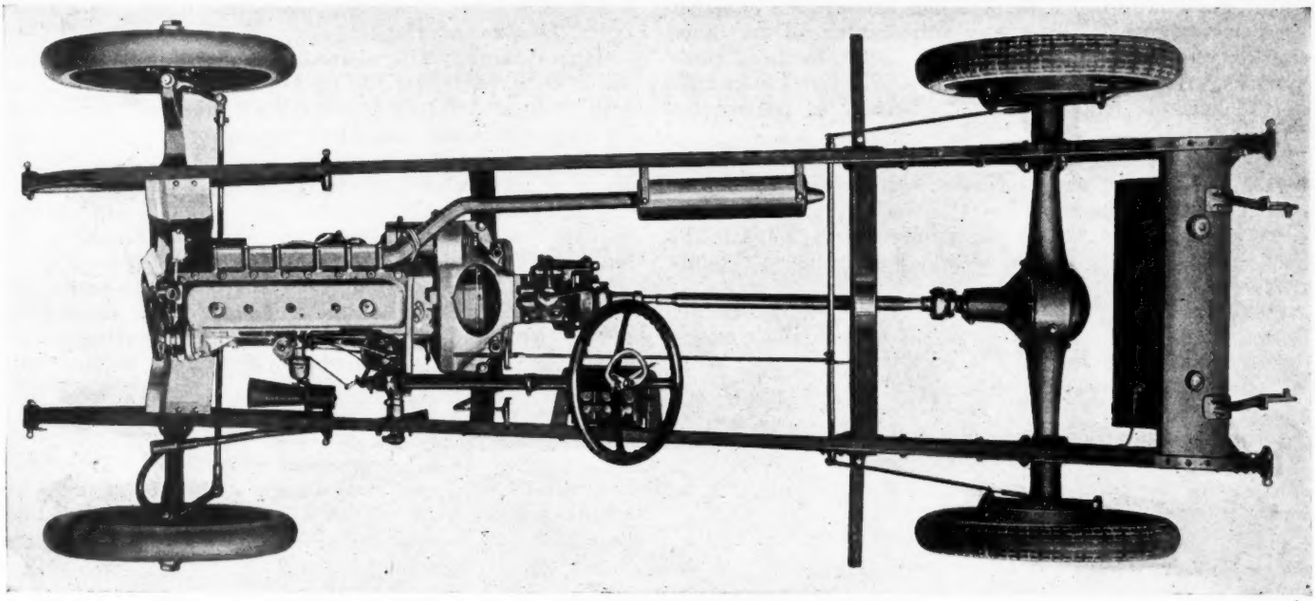
Structurally, the engine is a very good production job, the cylinder castings including merely the barrels with the top and bottom flanges and water jacket. There are no fins on the cylinders, making an easy casting and one which has desirable water space. The cylinders are reamed. The cylinder head also makes a simple casting and one which is easy to machine. Besides the valve holes, there are sixteen 7/16 in. stud holes and the water and spark plug holes. This gives a well relieved casting and with the sixteen stud holes surrounded by sufficient metal, there is



Left side of the 3 x 4½ overhead valve, six-cylinder engine, showing carbureter



Front view discloses pleasing lines. Note complete splash guards



The chassis has 112-in. wheelbase and the car when complete weighs 2600 lb.

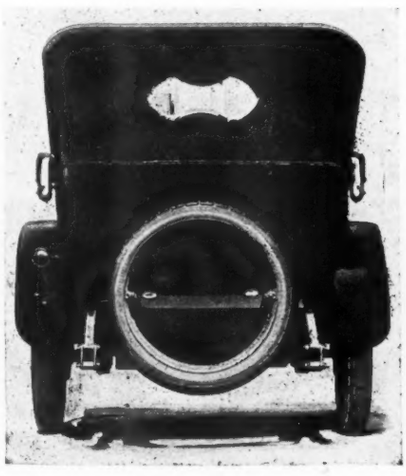
no danger of distortion. The oil pan is pressed steel.

All three rings are above the piston pin in the 3½ in. cast iron piston. These are 3/16 in. The piston pin bearing is in the end of the bronze-bushed rod, the pin diameter being 27/32 in. and the length of the bearing 1⅜ in. Die-cast babbitt is used in the lower bearing of the 9½ in. connecting rod. The crank bearing is 1⅞ in. and the diameter of the main bearing, 2 in. The main bearing lengths from front to rear are 2¾, 2⅝ and 3 5/16 in. The end thrust is taken at the center bearing. The curved-cheek crankshaft is in inherent balance and is forged by the twisting method for proper fibre alignment.

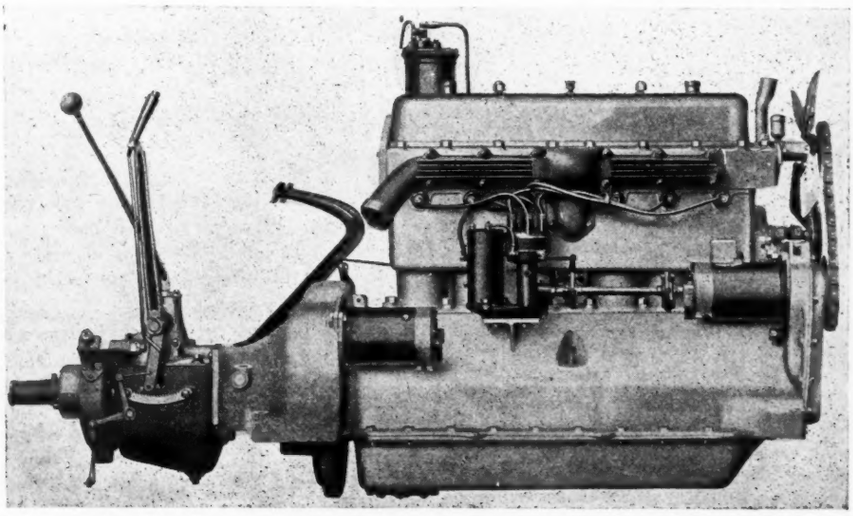
A 1¼-in. Morse silent chain of ½-in. pitch connects the three timing sprockets on the crankshaft, camshaft and generator shaft. The camshaft is 1 in. in diameter with integral cams of the constant acceleration type. The end thrust on the camshaft is taken by a collar at the front bearing. There are three replaceable bearings, the dimensions (front to rear) being 1⅛ by 3 in., 1 15/16 by 1 13/16 in., and 1 by 2½ in.

Some important features are utilized in connection with the valve lifter mechanism. The valve guide is cast iron, pressed within the cylinder casting and held in place by dog clamps. The push rod seats within the hollow tappet and there is a thimble on the end of the rod, bearing in a spherical seat in the rocker arm. The rocker shaft is in two parts, each part taking care of three cylinders. It is ¾ in. seamless steel tubing, hardened and ground. The valve clearance adjustment is made by a stud screwing through the valve end of the rocker arm.

Ingenious use has been made of the steel tube shaft for lubricating the valve mechanism. There is a wick cord in the center and for each section of the steel tube there is a lubricator near the outer end, which feeds to the wick. From the tubular shaft to the spherical thimble bearing there is an oil lead fed by centrifugal force. This gives a slow feed only while the engine is running, as the level of the spherical seat is above the wick in the rocker shaft tube. This provides an ingenious method for taking care of what has proven to be one of the most difficult parts to properly lubricate in an overhead valve mechanism, and it will be of considerable interest to see how this works out



Rear view



Right side of motor, showing distributor, generator and starting and lighting equipment

in practice. The test cars in which this system has been used have shown it to be very satisfactory. Dust is excluded from the mechanism by the detachable head cover mounted on a cork gasket. As the lubricators are outside of the head, it will seldom be necessary to remove the latter.

A simple system of manifolding distributes both the intake and exhaust gases. No hot spot is used, the intake header entering the center of the block directly from the vertical flange carbureter, distributed both ways. The heat of the water in the head and that radiated directly from the combustion chamber is relied upon to complete vaporization. The exhaust is equally simple, the header leading straight out from the combustion chambers on the opposite side from the inlet, the exhaust manifold being waved to form expansion chambers for the outflowing gas.

Exhaust and intake are on opposite sides and the layout is such that the electrical appliances are all on the exhaust side of the engine and the gasoline accessories all on the intake side, thus cutting fire risk to the minimum.

On the combined pressure and splash oiling system the gear pump is driven by spiral gears off the rear end of the camshaft and delivers to a lead running the whole length of the engine. From this, branch leads go to each main bearing, camshaft bearing and the chain case. There is an oil pressure gage on the dash. All other bearing surfaces are taken care of by splash.

Gray & Davis electrical equipment provides starting, lighting and ignition. The breaker-distributor is mounted on a magneto base and driven by a shaft through two flexible leather disk couplings. The mounting is interchangeable with the magneto, which is provided for $45 extra, retail. The ignition system is closed circuit and the car fires 2, 5, 3, 6, 2, 4. The generator and starting motor mountings are standard S. A. E. type.

The centrifugal cooling water pump is bolted directly to the cylinder block. The water jacket and radiator combined have 3 gal. capacity. The fan is driven by a V-belt from the generator shaft.

Some unusual features are incorporated in the rear axle, which is a Cleveland design throughout. It is a spiral bevel with a fixed hub mounted on Timken roller bearings. Its most noticeable feature is the use of a carrier to support the pinion shaft assembly. Referring to the sectional drawing herewith, the carrier is screwed into the housing and the pinion shaft assembly is mounted in the carrier on two sets of Timken bearings. The adjustment of the pinion is controlled by the depth to which the carrier is screwed into the housing, sufficient clearance being provided between the end of the housing and the shoulder on the carrier to allow for adjustment. The bearing adjustment is made by the double nut system in the usual manner.

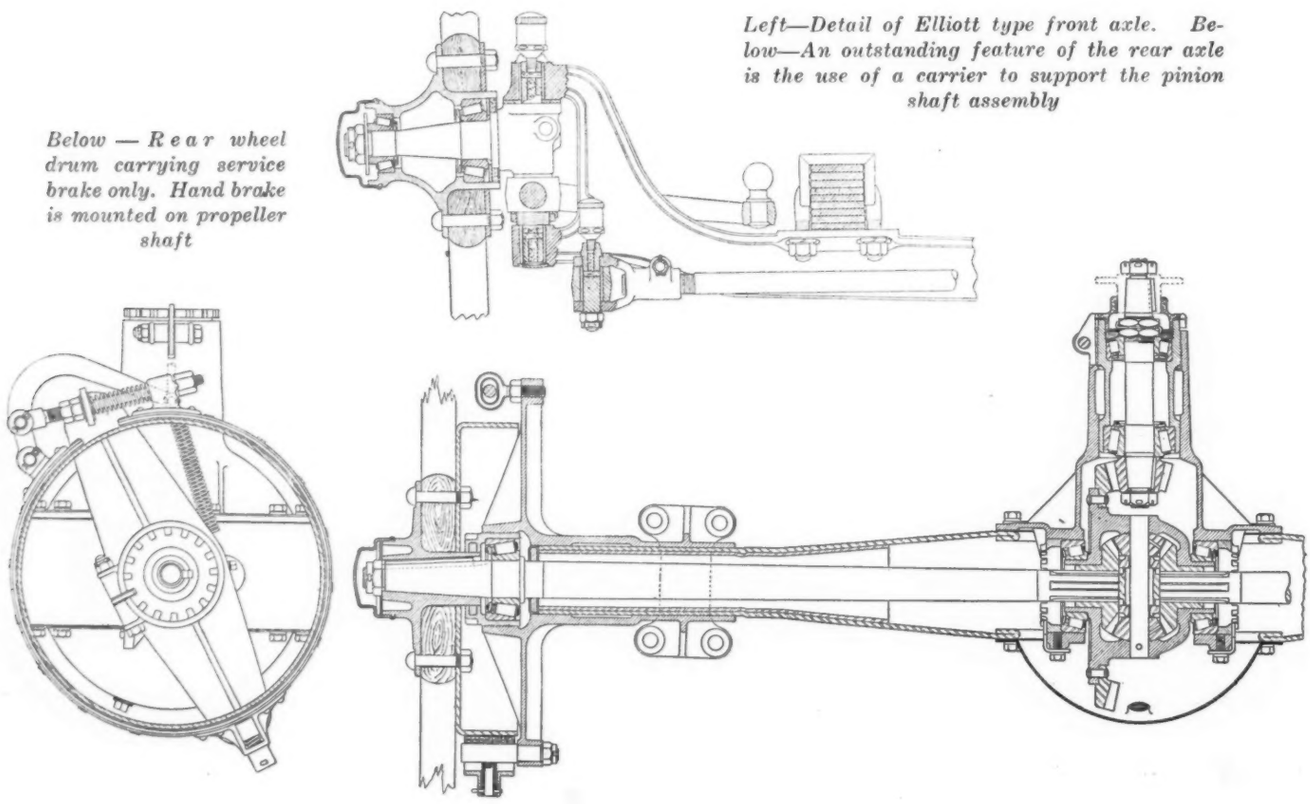
The ring gear is riveted on the differential carrier. The Timken bearings are in threaded caps for adjusting the bearings and locating the ring gears. The differential is a two-pinion bevel type design. The rear wheels are mounted on the fixed hub, which is supported by six splines on the rear axle shaft. Timken bearings are also employed for the wheel mounting.

The pressed steel brake drum which is bolted to the rear wheel and hub takes only the service brake. It has a diameter of 12⅜ in. and a face width of 2 in. The axle housing is also pressed steel. The hand brake is mounted on the propeller shaft.

The front axle is a conventional Elliott type, mounted on Timken bearings, and practically all of the other chassis parts follow customary practice. The frame is a taper type with a kick up over the rear axle. It is 6 in. deep at the center and has four cross-members. It carries the engine at four points. The springs are 38 by 2 front, with eight leaves, and 52 by 2 in. rear. The rear springs have a chrome vanadium main leaf so as to be able both to carry the weight and to take the reactions of the drive (Hotchkiss drive).

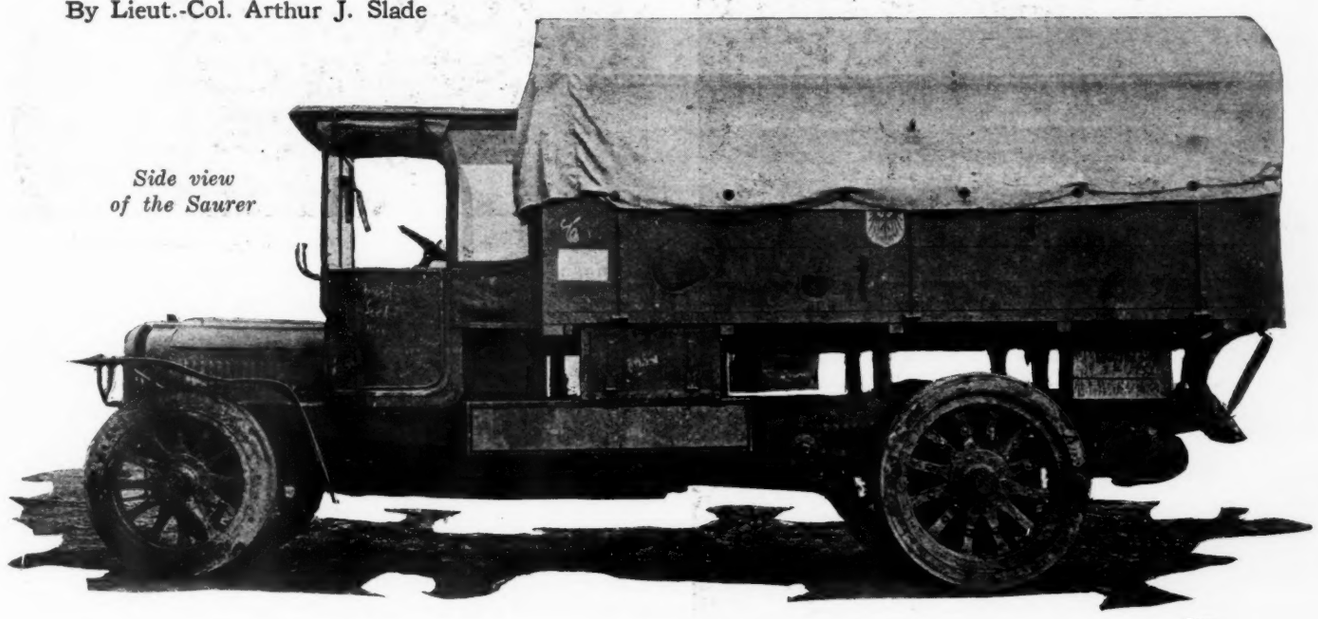
Left—Detail of Elliott type front axle. Below—An outstanding feature of the rear axle is the use of a carrier to support the pinion shaft assembly

Below — Rear wheel drum carrying service brake only. Hand brake is mounted on propeller shaft



No Standardization of Parts of the German Army Trucks—Part II

By Lieut.-Col. Arthur J. Slade



Side view of the Saurer

In continuing his introductory article of the study of German army trucks delivered to the A. E. F., Col. Slade tells of the lack of standardization and the difficulty in making repairs on these trucks. He also goes into such collective items as weight and he tabulates the 47 types as to drives. He calls attention to the lack of many of the refinements that Americans consider necessary to the operation. Next week he will discuss frames.

WHILE making examinations of the various models of trucks in connection with the selection of samples for the collection, about a dozen were partially disassembled and, though this work was not carried very far, it was evident that they were not constructed in such a manner as to provide ready accessibility for removal or repair of a unit or a component part.

In removing the cargo bodies it was found that in some cases the back of the driver's cab formed the front of the body. In taking off the cabs a great deal of piping, wiring and controls had to be disconnected and removed and, without the use of a crane, the dismounting of these heavy parts resulted in the breakage of exposed parts on the chassis.

Underpans were fastened in complicated ways, were difficult to remove and more difficult to replace. Radiators were removed without difficulty, but in taking off cylinder blocks and fronts of timing gear cases it was often puzzling to know how to proceed in a manner which would not necessitate removal of an excessive number of minor parts.

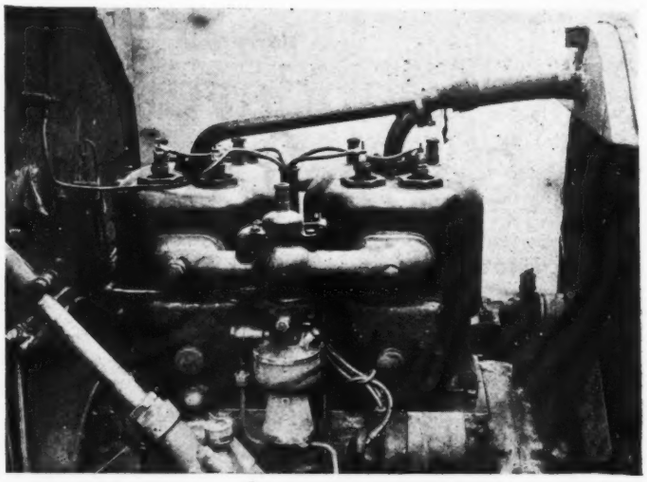
Accessibility is so necessary in making field repairs and properly maintaining vehicles which cannot depend on good garage and shop facilities, whether in commercial or military service, that this can be considered one of the principal criticisms of the German trucks, though it must be frankly admitted that the same criticism can be brought against much of the equipment used in the Allied armies.

In the German transport service it would seem that the skill of the operating personnel and the mechanics attached to the shop truck of each train was evidently depended upon to maintain the equipment in serviceable condition by means of repairs to old and worn parts rather than by the substitution of new parts when the old became unserviceable.

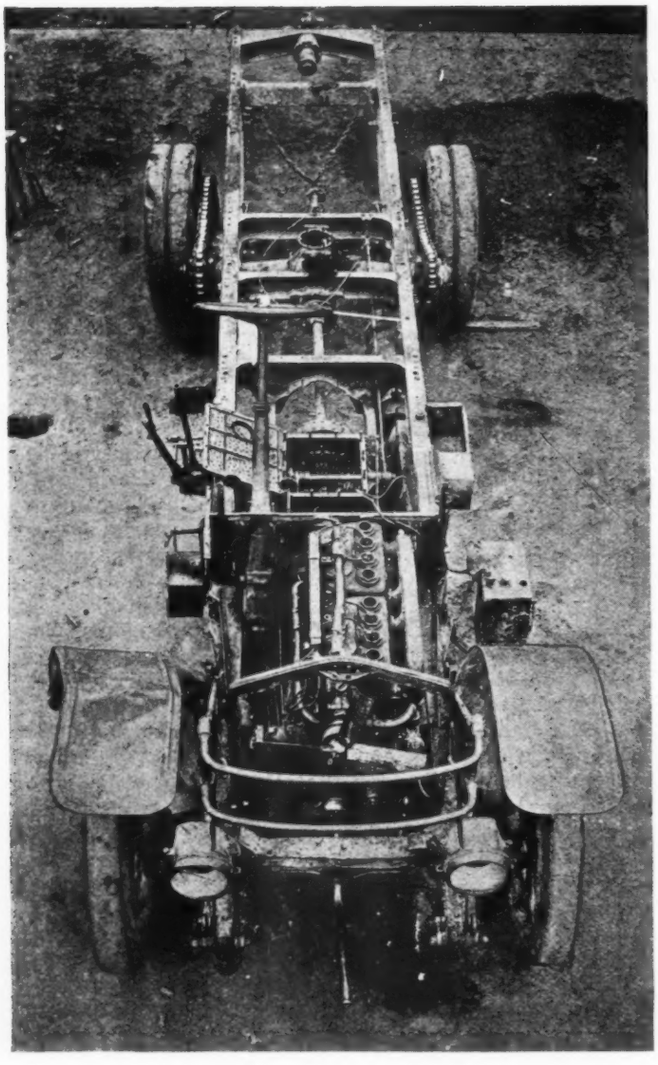
That this method could be successfully carried out was evidenced by the excellent condition of two complete German trains turned over to the U. S. Army at Montabam, in the Coblenz bridgehead, every feature of which showed excellent care, including tools and equipment, but, on the other hand, any lack of qualified personnel resulted in the serious deterioration of the vehicles.

It was stated by German officers of the transport service that previous to the March, 1918, offensive, 50,000 motor transport men were transferred to the infantry to serve in the line and new untrained men substituted after a five weeks' schooling as drivers and mechanics, with the result that in the Seventh German Army alone there were 1400 avoidable accidents resulting in trucks being laid up for repairs during the period of one month, that army having 8000 trucks at the time.

The combination of design and production of military



At left, a front view of Saurer truck and, above, a right-hand view of the engine, showing unusual construction features



Chassis of the Hansa-Lloyd

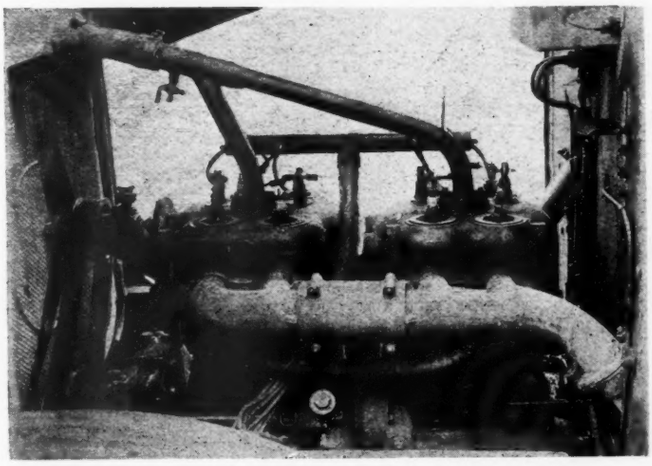
vehicles providing for readily replacing interchangeable parts or units when available, with skilled operating and maintenance personnel capable of making emergency field repairs within the operating unit when replacement parts are not available, obviously furnishes the practical solution of the problem of keeping army motor transportation mobile under the unexpected and variable conditions arising in war.

The German armies varied in size, and the equipment of motor trucks assigned to each varied correspondingly from 3000 to 16,000, and it was stated that in all 110,000 trucks had been used during the whole period of the war on all fronts. Although the factories producing the trucks were used for reconstruction of vehicles and the field repairs were made by the machine shop truck units attached to truck trains, there was also provided for each army a repair park, back of the lines, having a personnel of 300 men, and it is said that in Belgium additional base repair parks were established further in the rear in which civilian labor was employed or perhaps impressed into service.

The total weight of the trucks, complete with body, cab and all equipment, averaged about 9000 lb. for those of 3½ tons capacity and about 10,000 lb. for those of 4½ tons capacity, and the weight distribution would run about 70 per cent rear and 30 per cent front. In the collection of 47 trucks, 35 are chain driven and 12 have various forms of shaft drive. The trucks, of which the largest numbers were delivered to the four Allied armies, are as follows in the order of quantity:

	Tons	Drive	Reduction High	Reduction Low
Benz	3½	Chain	15	50
Bussing	4½	Chain	14.5	74
Mulag	3½	Chain	12	61
Opel	3½	Chain	16	74
Benz	4½	Chain	15	50
Adler	3½	Chain	14	51
Arbenz	3½	Chain	17.5	61
Daimler	4½	Shaft	16	80
Hansa-Lloyd	3½	Chain	18	106
N. A. G.	4½	Chain		
Daimler	3½	Chain	14	60
Stoewer	3½	Chain	14.5	92
Dixi	3½	Chain	14.5	64.5
Horch	3½	Shaft	14	68

Those listed below were delivered in lesser numbers and



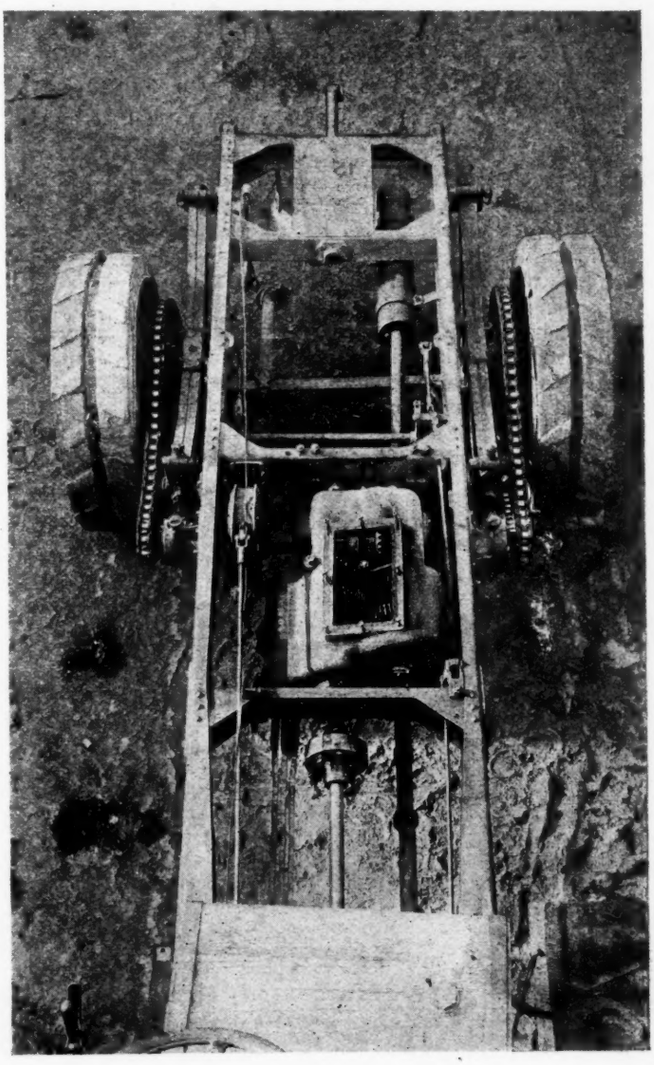
Above, a left-side view of the Mulag engine; right, a rear view of the Benz truck

in some instances only a single vehicle of a make or model was found:

	Tons	Drive		Tons	Drive
Saurer	3½	Chain	Ausbach	4½	Chain
Vomag	3½	Chain	Benz	1	Shaft
Adler	4½	Chain	Benz	4½	Shaft
Durkopp	3½	Chain	Bergmann	4½	Chain
N. A. G.	3	Chain	Bergmann	4½	Shaft
Bergmann	3½	Chain	Bussing	5	Chain
Saurer	4½	Chain	Daimler	4½	Chain
Stoewer	4½	Chain	Pokorny	4½	Chain
Opel	4½	Chain	Daimler	1	Shaft
Arbenz	4½	Chain	Dixi	3½	Shaft
Dux	3½	Chain	Durkopp	3½	Shaft
Mulag	4½	Chain	Hansa-Lloyd	1	Shaft
Benz	3½	Shaft	N. A. G.	3½	Shaft
Benz	5	Chain	N. A. G.	4½	Shaft
Bussing	3½	Chain	Nacke	3½	Chain
Daag	3½	Chain	N. S. U.	2	Shaft
Daag	4½	Chain	Opel	2	Shaft
Daimler	3½	Shaft	Opel	3½	Shaft
Daimler	5	Shaft	Podeus	3½	Chain
Dixie	4½	Chain	Rex	1	Shaft
Hansa-Lloyd	4½	Chain	Saurer	2	Shaft
Horch	4½	Chain	Komnick	3½	Chain
Loeb	3½	Chain	Audi	2	Shaft
Loreley	1	Chain	Graf Stift	3½	Chain
N. A. G.	5	Chain	Hercules	3½	Chain
Rex	3½	Chain	Heinr. Ehrart	3½	Chain
Vomag	4½	Chain	Presto	2	Shaft
Adler	1	Shaft	Union	4½	Chain
Adler	3½	Shaft			

The preponderance of chain drives made possible the reduction of speed necessary when tires were changed from rubber to steel because of the rubber shortage which became acute in 1916, and the gear ratios between engine and driving wheels are shown on this list, the change being accomplished merely by substituting driving sprockets on jack shafts. The design of driving sprocket mounting naturally affected the limit of gear reduction.

All transmissions are of the four-speed selective type, some being indirect on all speeds, although the majority are direct on high, and the varying ratios between first and fourth are very noticeable, as indicated on the list. This variation is indicative of the wide dissimilarity in details of design throughout. The vehicles are decidedly individual in all their principal details and seem to represent the several ideas of their designers rather than any consensus of opinion on good design. There seems to be nothing about the German trucks which would indicate any



Chassis of the Arbenz

Group of mechanics who made the mechanical study of the trucks

tendency, such as is found among our so-called assembled trucks, to utilize well-known component units produced in quantity and assembled in a conventionalized manner. Although one of the German technical officers at Spa had stated that certain engines, clutches and other units were used in several makes of trucks, no evidence was found to support this statement.

This lack of similarity in design and construction probably made little difference in connection with the operation of the truck trains, as the drivers were trained not only in operating the vehicles but also in making mechanical repairs; each truck carried its necessary spare parts and the machine shop truck and mechanical personnel were available with each company at all times.

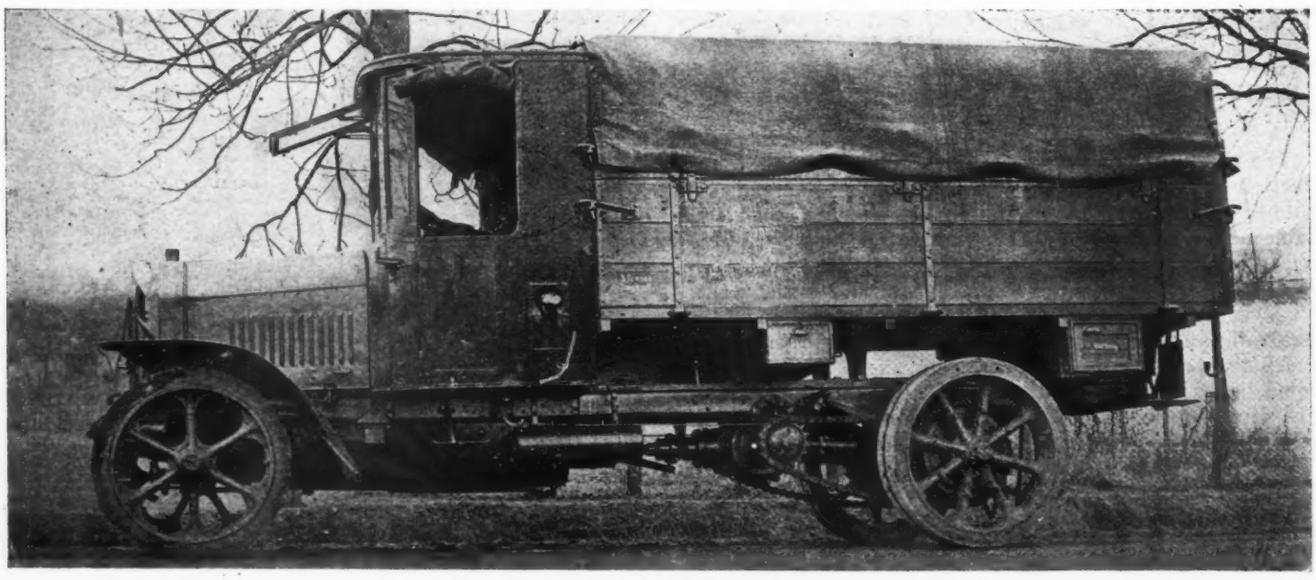
In connection with overhaul and reconstruction, the factories manufacturing the various models were utilized for this purpose, so that the multiplicity of models would not appear to be a serious matter when everything was running smoothly, but when materials ran short and the skilled personnel was withdrawn from the trains, and the factory personnel was reduced to fill the ranks of the armies, the lack of uniformity in design and interchangeability of units undoubtedly became a serious matter.

Inquiry was made as to the cost of the German trucks. It was stated that the average cost was 40,000 marks. With the mark at par, this means a value of $10,000 each, and the explanation was given that boys of 15 and 16 years of age employed in the factories received 16 to 20 marks per day. With labor cost so high in comparison with the normal price of European labor, manufacturing methods involving so much manual work must have caused a heavy financial burden.

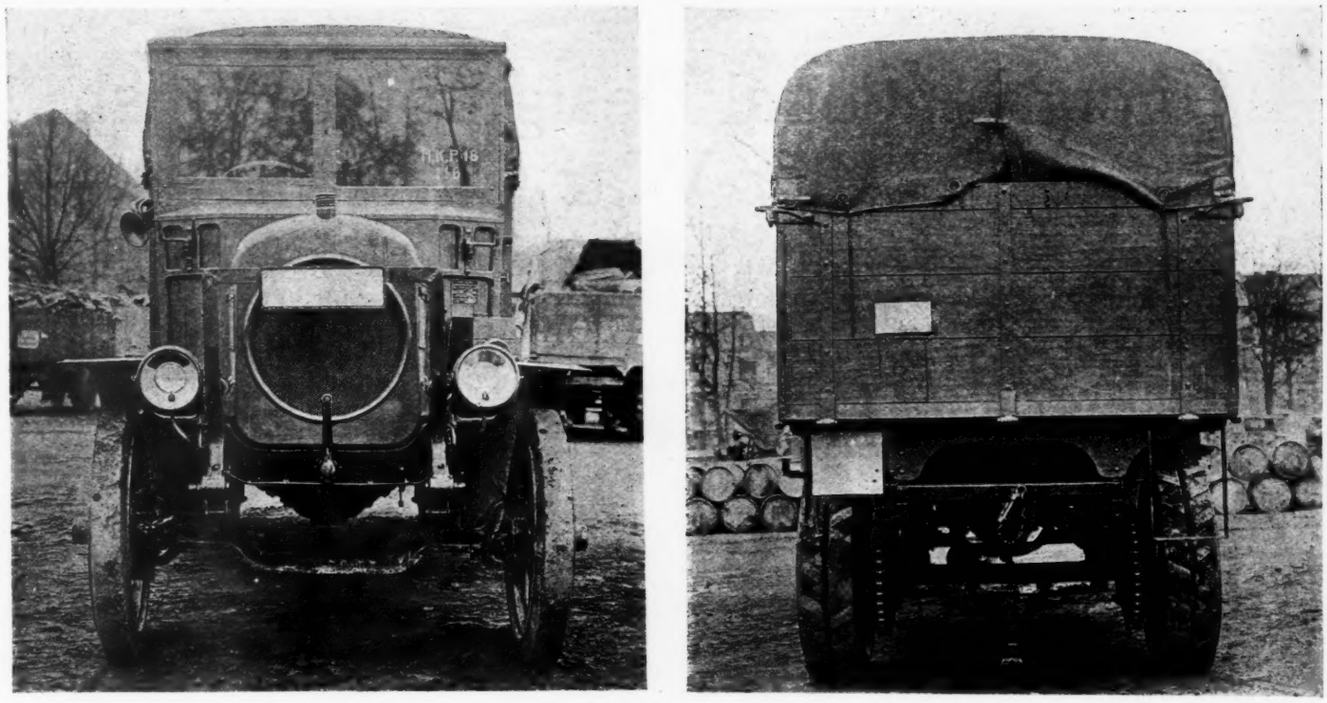
In addition to the hand machining and fitting being wasteful of labor, much bad forging work appears on these trucks, drop forgings being conspicuously lacking.

The vehicles are all provided with trailer towing connection in addition to eight hooks at the four corners of chassis. On some hill tests made with a trailer load, it was apparent that the trucks are entirely capable of trailer haulage when sufficient traction can be had.

No trailers were required to be delivered under the armistice conditions, but many abandoned trailers were



The Daimler



Front and rear views of the Adler, showing the luminous boards that were supplied to avert collisions. No bumpers were used

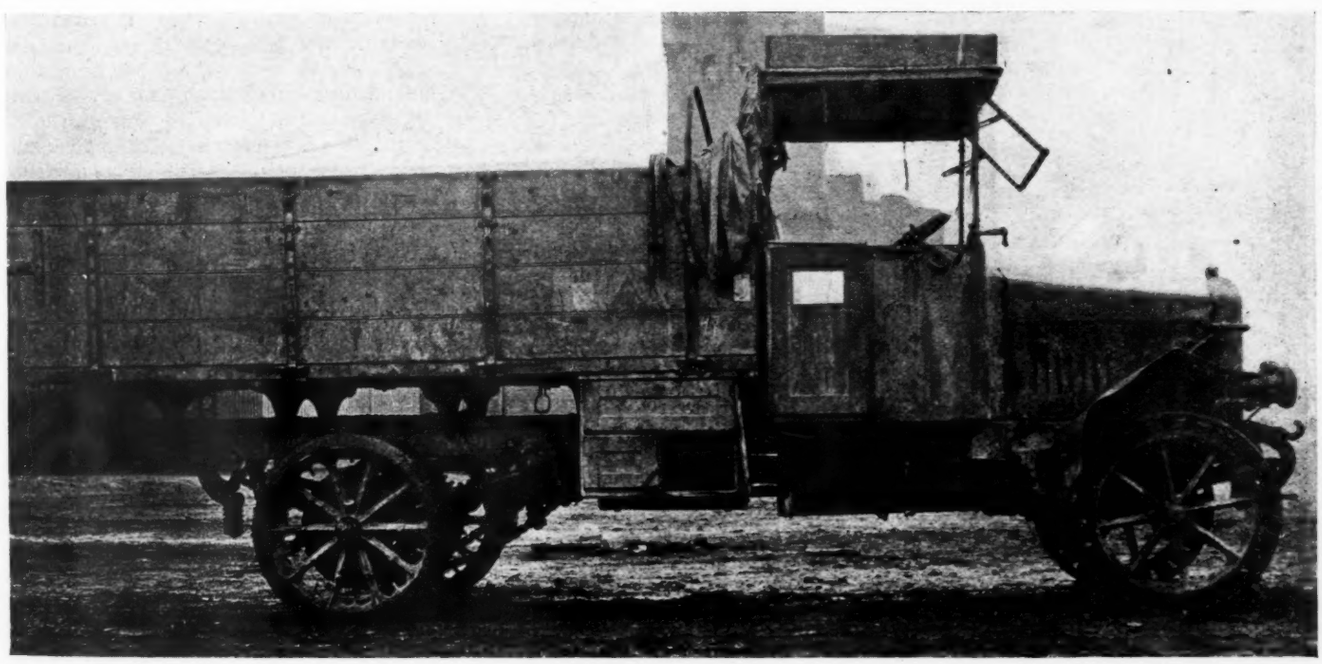
observed, along with abandoned trucks, on the lines of retreat in France. The indications are therefore that trailers were extensively used, and there is no apparent reason why they should not be employed much more generally in military operations than was done in the Allied armies, where towing hooks were generally applied to trucks but cargo trailers seldom employed.

The Allied air services had two-wheel trailers for carrying disabled planes, but it was unusual to see trailers carrying supplies even on lines of communication, where they could have been used to advantage under intelligent direction.

Bumpers were not installed on the German trucks, either in front or rear, but a form of radiator guard was generally installed, consisting usually of a single supported cross iron attached to chassis frame members.

The front view of the Adler truck shows such a typical guard and also a luminous painted plate attached to same. The rear view of the same truck shows a similar disc attachment under the body, and the rear axle sprag which in a very similar form was found attached to all trucks. The towing connection can also be seen, being of the clevis and pin type, which is the design generally found.

(*To be continued*)



The Hansa-Lloyd

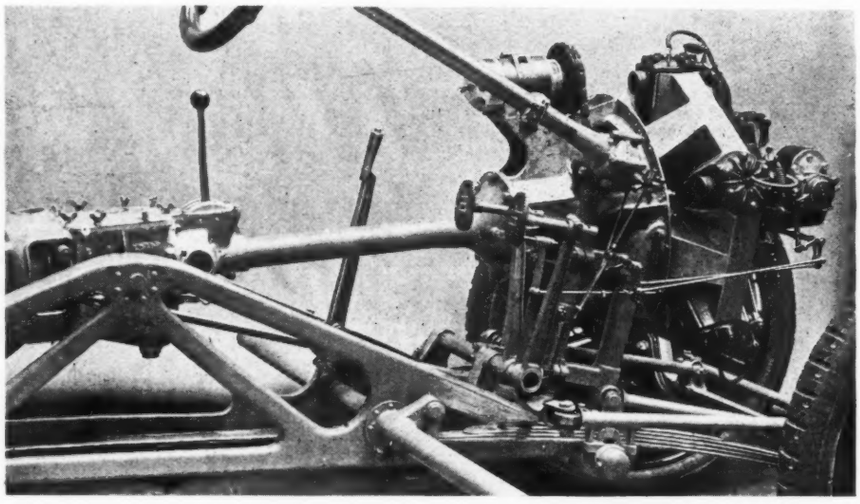
Unconventional Design of a British After-War Car

Here is a car with a five-cylinder, radial, air-cooled engine that is causing much comment abroad. Several important modifications have been made in the design since it was mentioned in AUTOMOTIVE INDUSTRIES on May 22, so this article is not a repetition but an amplification of the former one.

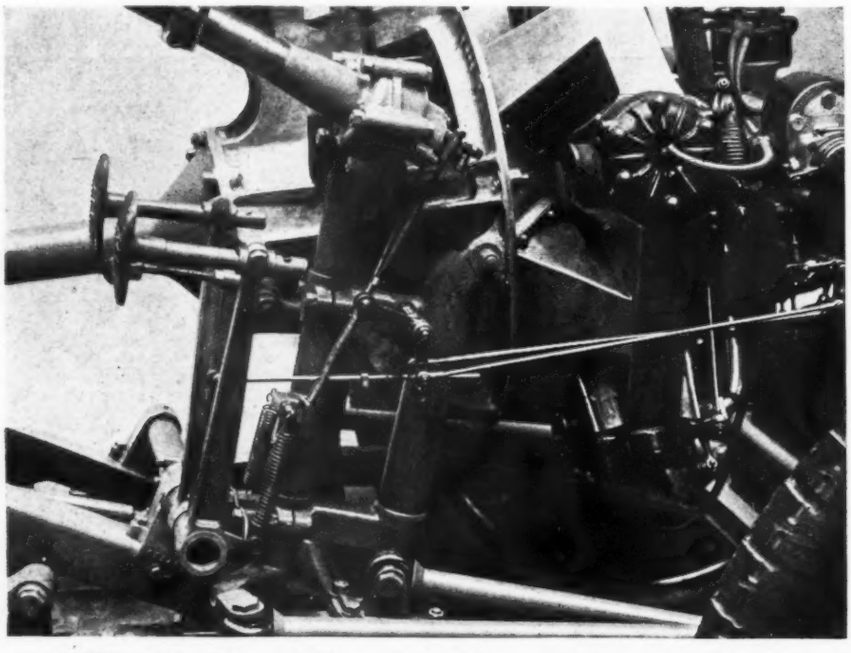
THE Enfield-Allday car, which is going into production, is causing much comment by its complete novelty. The chief item of interest is the five-cylinder air-cooled 10-hp. radial engine. Several important modifications have been made in the original design, which was mentioned in AUTOMOTIVE INDUSTRIES of May 22. The accompanying photographs depict the first complete chassis of this type.

Incidentally, the Enfield-Allday Motors, Ltd., sponsor of this design, is one of the oldest firms manufacturing automobiles in Great Britain and is not a firm that would be expected to stake its excellent reputation upon a design in which it has not unlimited confidence.

Although the chassis is only intended for a light three-seated body, it will be realized that the principles embodied in its design are quite capable of being utilized in much larger types should the advantages be proven. The complete chassis weighs but 800 lb., while the five-cylinder engine, 62 x 80 mm. (2.44 x 3.15 in., 74 cu. in. capacity) weighs only 123 lb., with its crankcase and magneto but without the aluminum unit which supports it and constitutes, in its prolongation, the housing of a multiple plate clutch. The power developed is in the neighborhood of 32 b.hp. at 2500 r.p.m., so that the weight per horsepower of engine unit comes out at about 4 lb. per horsepower.

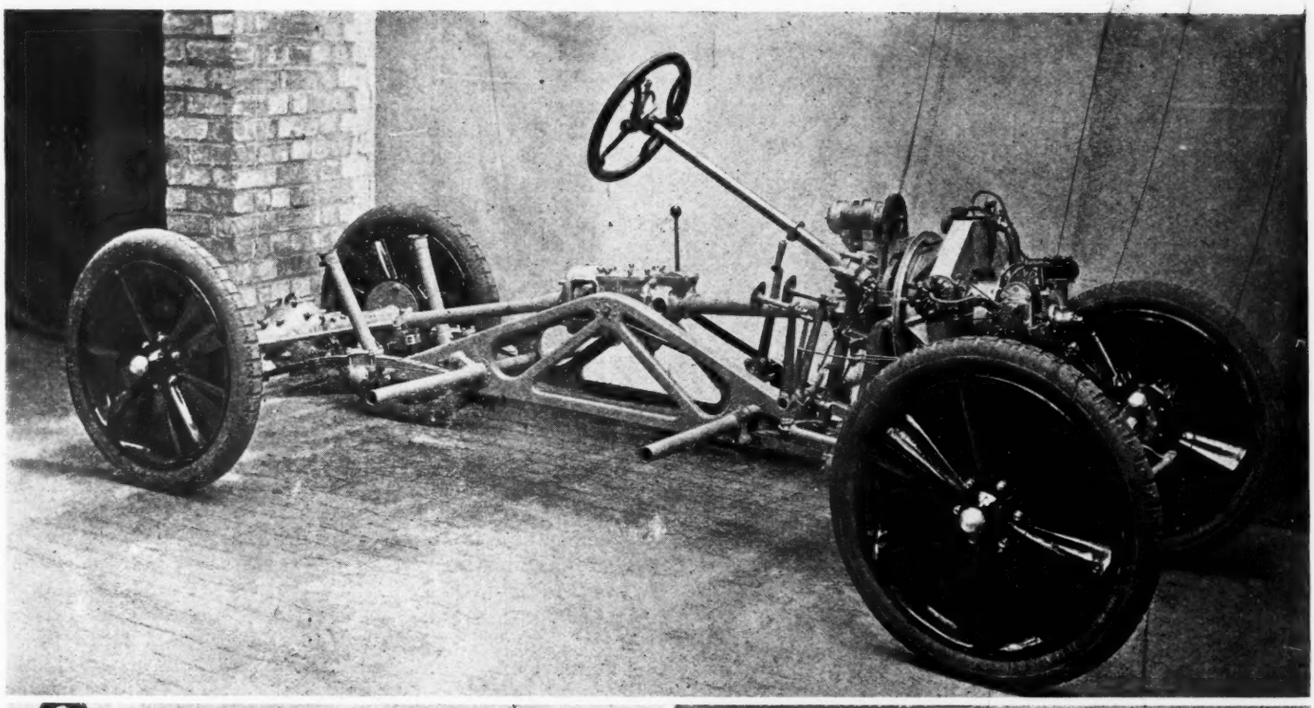


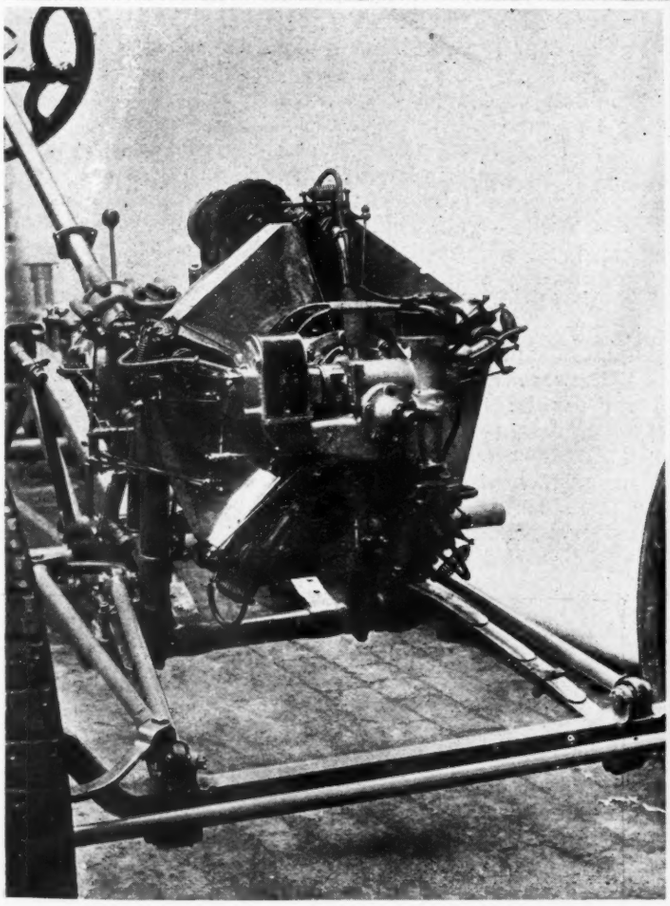
Engine, clutch and gearbox unit. The steering gear is peculiarly mounted, its housing being carried at the summit of a tubular member, through which passes the long shaft having the worm wheel attached at one end and the steering lever below

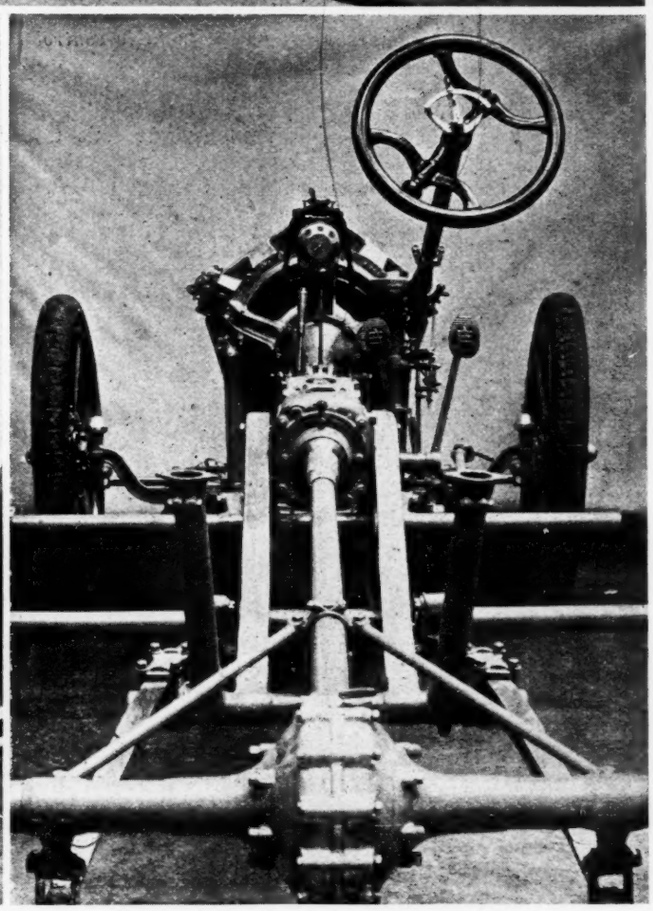


Offside view of five-cylinder radial engine. Note the cowling of the cylinders with the trunks leading to the enclosed flywheel. The steering gear mounting and a close view of one of the engine supports are also shown

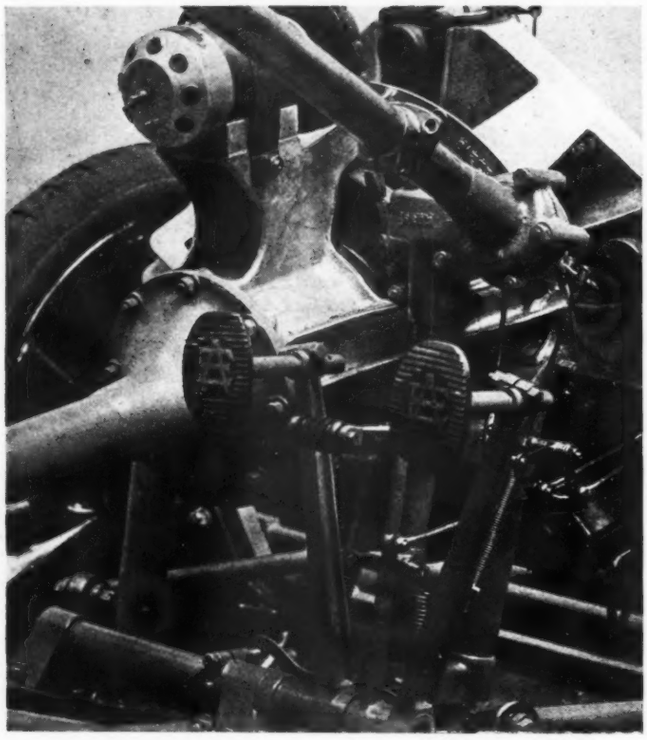
Apart from its five radial cylinders of cast iron with integral heads, a feature of the engine is the design of the overhead valves, which are short concentric sleeves; the outer one, the exhaust valve, has a seating in the cylinder head, while the inner one, the inlet, is provided with a seating within the outer sleeve. The latter has a ring of ports through which the fresh mixture is admitted when the inlet valve is raised. On the exhaust stroke both valves are lifted together, and the gases pass out beneath them to an annular passage formed in the cylinder head and thence through an exhaust elbow to a ring pipe connected to the main pipe leading to the silencer.







Above—The complete chassis of the radial engined car. The peculiar frame design is noticeable, also the elevated positions of engine and gearbox. To the left—Engine installed in the especially designed chassis, showing the accessible position of the magneto, the ball-ended radius rods of the front axle and the upright tubular engine supports. To the right—Rear view, showing the relative positions of the two pressed steel triangulated frame members. The diagonal stiffening rods of the axle and propeller shaft, the two tubular supports for the rear end of the body and the anchorage of the rear cantilever springs are also shown



Clutch casing, dynamo support and adjustable control pedals

A pair of overhead rockers take effect upon the valves of each cylinder, and are operated by light rods under tension when the valves are raised. A single horizontal spring serves to close both valves, being coupled at each end to an upstanding lever on each rocker. An aluminum cover or false head incloses the valve rockers and has a cylindrical projection passing down to form the inner bearing for the valves, leakage of gas being prevented by three compression rings arranged round it. The spark plug is screwed into the bottom of this same projection, and therefore sets in a central position in the combustion space. The latter is extremely symmetrical and almost ideal from a thermal efficiency point of view, while the valves themselves provide exceptionally large areas of port openings. Their concentric arrangement also prevents distortion; in fact, an important claim on behalf of this engine is the uniform cooling which obtains at all points.

Lubrication of the valves is on the petrol system, as used on some two-stroke motorcycle engines—a proportion of lubricating oil is mixed with the fuel.

The cams are formed on a dual disc, two for the exhaust, two for the inlet, and two extra ones which serve to assist in raising the inlet valve when both valves are raised together on the exhaust stroke. The cam disc runs at quarter engine speed, being driven by the crankshaft, with which it is concentric, through internal reduction gearing.

The carbureter is bolted to a flange having a port leading to an annular space surrounding the front end of the crankshaft bearing housing; thence the mixture is conveyed through pipes radiating to each cylinder. Carburetion has been one of the great difficulties to be overcome by the designers, but they claim to have succeeded in obtaining quite uniform distribution to each cylinder.

The engine as a whole is mounted so that it can be rotated on its support to bring the lower cylinders uppermost, if need be, after the ignition and throttle rods and the oil pipes have been disconnected.

One of the five pistons, which are of the aluminum slipper type, is secured to a master connecting rod with a white metal lined big-end bearing, the other four pistons being coupled to short rods articulated to the master rod. The lubrication is on the dry sump principle, two pumps being provided, one of which draws the lubricant from the oil tank and discharges it under pressure into the drilled crankshaft; the other draws the surplus oil from the bottom of the crankcase and returns it to the tank. Flooding of the lower cylinders is prevented by their ends projecting into the crank chamber to the extent of 1 in. Following aero engine practice, the crankshaft is built up of two sections; it is supported by one ball and three roller bearings, the former at the flywheel end.

The temperature of the cylinders at full load is maintained at approximately 250 deg. F. by means of an air draft drawn through cowling almost surrounding each cylinder, and through trunks leading to the inclosed flywheel, which has vanes on its periphery. The flywheel, therefore, forms an exhauster fan and discharges hot air in front of a bulkhead, which also serves as the sloping dashboard of the body.

The engine is bolted to the 18-in. diameter flange of the aluminum casting which incloses the flywheel and clutch. The weight is taken by two almost vertical tubular members, but the engine is additionally supported by the fact that it forms a unit with the three-speed transmission casing, being connected thereto by a tubular member rigidly secured at each end. The transmission casing is carried on two trunnion bearings at the apices of the triangulated pressed steel main frame members. The latter are only 8½ in. apart and support the fuel tank between their horizontal members.

The selector mechanism of the transmission is arranged in a compartment at the front end of the casing. As the latter is mounted very high in relation to the seats, quite a short lever is needed; it projects centrally above the seat level, but, although it is short, ample leverage is provided and gear changing is remarkably easy. A rearward continuation of the transmission casing incloses a cone type brake, the stationary member of which is secured to its casing, while the rotating member is moved axially when the brake pedal is applied.

Between the transmission and the inclosed propeller shaft is the only universal joint in the chassis; it is of the roller bearing type and is completely inclosed. The final drive is by means of helical gears to the semi-floating rear axle, which runs on ball bearings.

Full cantilever springs are used back and front; the original plan of using a single central spring at each end was discarded, and in place thereof are two springs set at

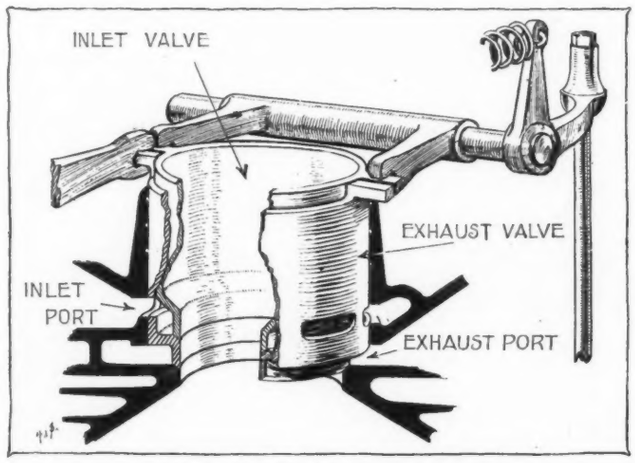


Diagram of valve arrangement

an angle and shackled fore and aft; ball-ended radius rods are used for the front axle.

In regard to the steering gear, this is of the worm and worm wheel type, the wheel shaft being arranged almost vertically in a tubular casing which supports the gear housing. At the lower end of the shaft is a horizontally arranged steering arm connected with a push-and-pull rod having the same type of ball joint as is used for the radius rods.

The body is supported at six points, four at the ends of two tubular cross members and two at the summit of tubular stanchions corresponding with the pair at the front which take the weight of the engine unit.

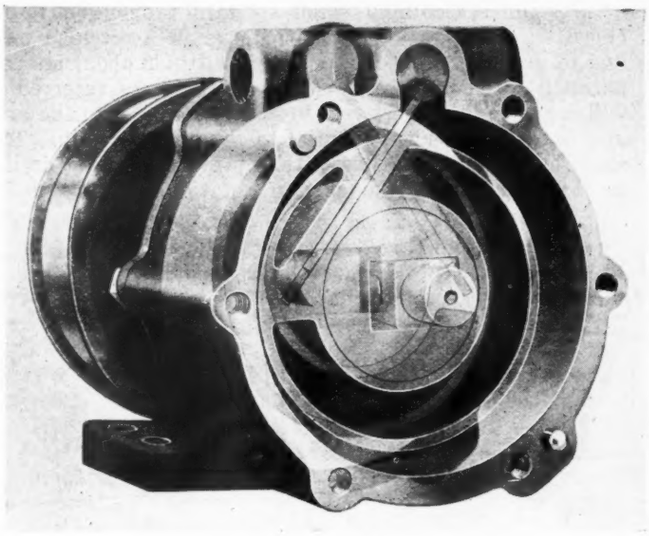
The wheels are of a type which is becoming quite popular in Great Britain. The rims are supported by single discs in place of spokes, but the discs are pressed out to give a corrugated effect and greater lateral stability than a flat disc. Tires of 810 x 90 mm. are fitted, and the wheels are detachable by the removal of six nuts projecting from the hub boss.

The wheelbase of the chassis is 8 ft. 6 in., and the track is 3 ft. 10 in.

The low weight of this chassis should make it a distinctly attractive proposition as a "sporting" type of vehicle, and one which should appeal to a large class of users. Light 10-hp. two-three-seated cars are in great demand in England at the present time, but these light cars are by no means low in weight considering their power. The usual chassis with which this Enfield-Allday will be in competition weighs from 1100 to 1350 lb., with an engine of about 1200 c.c. (approximately 75 cu. in.) developing a maximum of 20 hp. at 2500 r.p.m.

A New Type of Pump

A NEW design of pump, for which great durability is claimed, as the motion of the principal parts is a rolling motion, will be marketed under the name Rollway.



Phantom view of Rollway roller

The pump chamber is a perfect cylinder, and is divided into two equal compartments, by a steel disc. On either side of this disc there is a roller, which is mounted on an eccentric provided with rectangular slot through which passes the square pump shaft. A spring inserted between the square shaft and the eccentric keeps the roller in contact with the pump chamber wall. As the pump shaft revolves, the line of contact between the roller and pump chamber wall travels around at the same speed of revolution. The two eccentrics are oppositely located on the shaft.

The rocker, which extends from the top of the pump down into the roller, cuts off the discharge side of the pump, so that the liquid cannot flow out of the intake. As the contacting line of the roller passes the intake of the pump, it creates a suction, gradually filling up the chamber back of the roller. When this point again reaches the top of the chamber, the liquid which it has taken in on the previous revolution passes out the discharge, while more is coming in at the intake side. The two compartments operating alternately produces a steady flow.

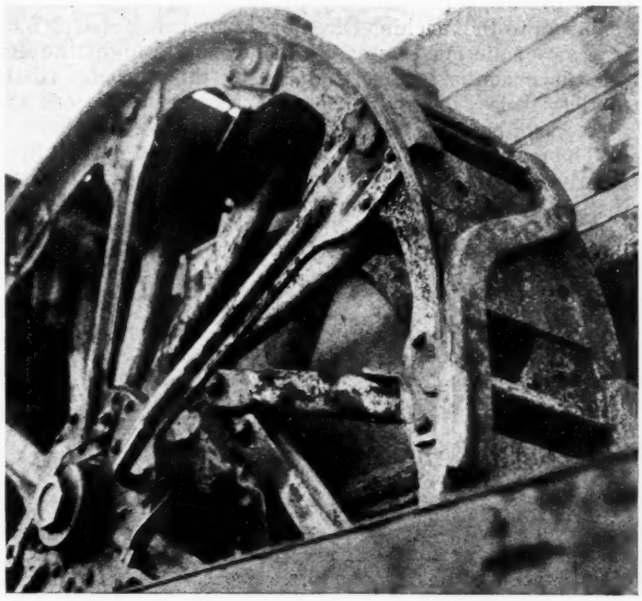
The spring between the eccentric and the shaft is an automatic release, and also prevents the pump from clogging. For instance, should a chip stick in the pump chamber the spring will compress and allow the roller to pass over it, and it will be washed out on the next revolution. It also operates when the stopcock is shut.

On the small pump, when the pressure reaches 20 lb. per sq. in., the spring compresses, allowing the roller to assume a central position in the pump chamber so that no liquid will be moved.

This pump is manufactured by the Michigan Machine Co.

Novel German Driving Wheel

A GERMAN military tractor, which was shipped to Ottawa Beach for the summer meeting of the S. A. E., but not unloaded because its front axle had been broken, was fitted with an interesting design of driving wheel. The wheel is made of pressed steel and S-shaped lugs of small depth are riveted to the rims, but in addition there is a series of spade type lugs of pressed steel which are hinged to a disk concentric with the hub and can be forced out or withdrawn by a mechanism concealed in the hub. A wrench for turning this mechanism is fastened to the hub.



German tractor drive wheel with adjustable driving lugs

Aerodynamical Considerations in the Design of a Propeller

In this article is presented a method of calculating the required dimensions and the probable performance of a propeller on the basis of airfoil theory. The fact that this method is advanced by Professor Levy insures it respect, for the writer is in charge of the wind-tunnel investigations for the National Physical Laboratory of Great Britain, an institution which corresponds to the U. S. Bureau of Standards. He is author of some of the best technical books on aviation.

By H. Levy, M. A., D. Sc., F. R. S. E.

AN aeroplane cannot be maintained in flight unless it be compelled to move forward at such a speed that the lifting force on the wings is at least sufficiently great to support the weight, but under these circumstances a dragging force on the machine is originated which must be overcome by some horizontal propulsion. This function is fulfilled by the propeller by communicating a backward momentum to the column of air passing through it, thereby passing on a corresponding quantity of forward momentum to the machine through the propeller shaft. When the aeroplane moves steadily in horizontal flight the drag on the machine is just balanced by this thrust. In this article it is proposed to discuss the considerations that serve as a basis in the design of an efficient propeller.

The motion of a body of aerofoil section in normal flying altitude gives rise to two component forces, a drag and a lift, respectively along and perpendicular to the direction of motion. The effect of the rotation of a blade of a propeller may be conceived from the same standpoint. If an aerofoil of exceedingly small span in proportion to its chord or depth be supposed to move in a circular path and in approximately normal flying altitude about an axis parallel to the lift, the two component forces referred to will correspond respectively to a force parallel to the axis of rotation and one tangential to the circular path. The small elemental aerofoil will thus provide a thrust or lift in the direction of the axis of rotation, so long as its motion in the circular path is maintained. The complete blade of a propeller may be conceived as built up of a large number of elements of aerofoils placed side by side along a radius of the disc of rotation, the sectional form of the aerofoil gradually varying from the propeller boss to the tip, and such a system, if continuously rotated, will give a continuous thrust determined by the sum of the lifts on the aerofoil sections, and a continuous torque due to the dragging forces on these sections. Figs. 1 and 2 give

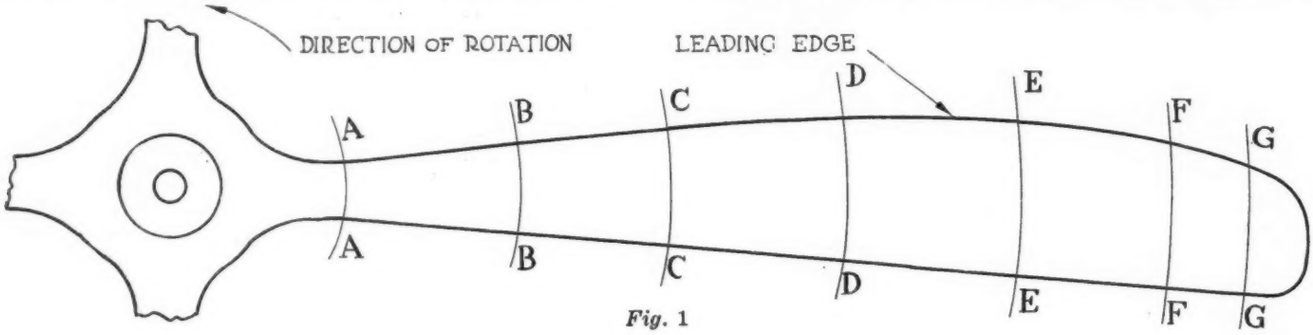


Fig. 1

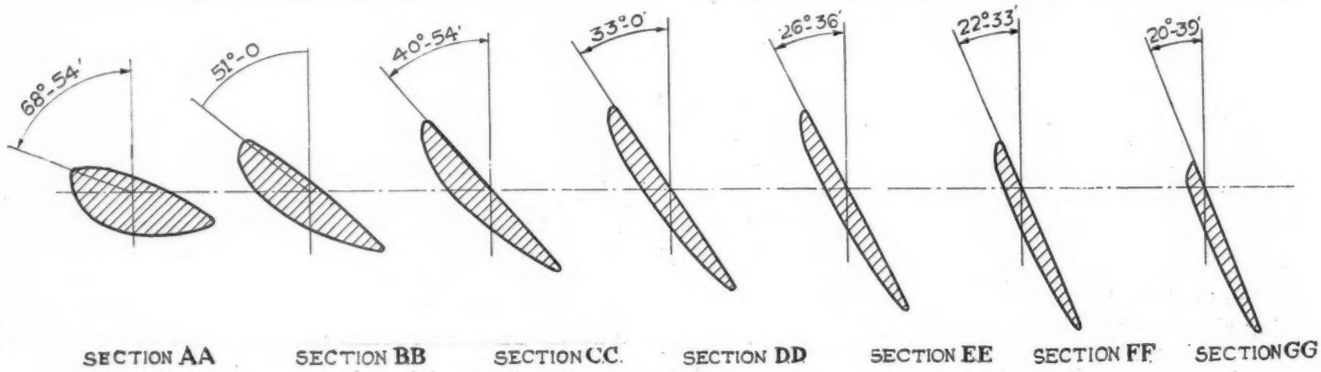


Fig. 2

the plan form of a propeller blade and the sections made by a series of circular cylinders whose axes coincide with the axis of the propeller shaft. Toward the tip, for the greater part of the propeller blade in fact, these sections are clearly of aerofoil shape, while in the neighborhood of the boss they are thicker and approximate more to stout form. In this connection it may be noted that near the boss the linear velocity of the elements is comparatively low, and very little lift or thrust can therefore be contributed from this region. A reduction of section to stout form with its low resistance is therefore quite intelligible.

If this conception of the constitution of a propeller blade is justifiable, and experiment will decide, it will then be possible, after determining the conditions that require to be fulfilled by these elementary aerofoils in an efficient propeller, to proceed to the design of a propeller by utilizing the known properties of aerofoils. That the propeller section exists, however, in a very different environment from that of an ordinary aeroplane wing is not difficult to recognize. The aerofoil theory as here propounded, for example, assumes that the forces on each aerofoil section of the blade are the same as those on a section of equal length of an infinitely long aerofoil of identical shape, but the mere fact that the contiguous elements on either side in the propeller blade are of different shape is sufficient to indicate that this cannot be strictly true. The air flow past any sections—and therefore the forces originated during its motion—are not determined purely by its own shape and speed, but must also be influenced by the airflow over the neighboring sections. Whether or not any serious error will be thus introduced, and if so how to correct for it, is a question that must be considered.

In the second place, the forces measured experimentally on aerofoils from which the forces on the propeller element would require to be deduced, refer always to steady, straight-line motion of the wing through undisturbed air. It requires no great insight to recognize that the motion of the propeller element is widely different. When the aeroplane is in straight-line flight the path of the propeller element is a helix formed from the combined circular motion about the propeller shaft and the forward motion of the machine. So far from the air into which it moves being undisturbed, the rotary motion of the blades, as a whole, is known to suck the air into the disc with a distinctly accelerated speed appreciably measurable for some distance ahead of the blades. It will become clear, however, that this additional "inflow velocity" can be allowed for with comparative ease in the estimation of the forces originated on each element.

In the third place, the tip of the blade, at which the speed is greatest, is composed of an element with a neighboring element on one side only. It follows that some form of end flow will originate that will find no place if the element is to be considered as far as forces are concerned as identical with that of an infinite aerofoil.

These three considerations suggest the principal sources of discrepance that may arise; the importance of carrying through a series of tests to check how far the theory is to be modified to allow for these differences is evident, before reliance dare be placed on its application. Before proceeding to discuss these modifications, however, let us consider what design of propeller, what shape and position of section is suggested by the bare theory as necessary for efficient operation.

Let *ABC* (Fig. 3) represent a section of a propeller blade at distance r from the axis of rotation y, the shaft rotating n revolutions per second. The total distance moved by this element in one section around the shaft is then $2\pi rn$. If v be the forward speed of the machine, then the resulting speed of this element is clearly compounded of these two perpendicular motions, and consequently the resulting velocity is

$$\sqrt{V^2 + (2\pi rn)^2}$$

Assuming then that the blade is moving into undisturbed air, this represents the relative wind speed, its direction represented in the diagram by θ being determined by

$$\tan \theta = V/2\pi rn$$

Measuring the drag D and lift L on the element along and perpendicular to the relative wind, the resultant forces along and perpendicular to the axes x and y respectively will be

$$X = L \sin \theta + D \cos \theta$$
$$Y = L \cos \theta - D \sin \theta$$

As far as the machine is concerned, since V is the useful speed developed, the rate at which useful work is performed is

$$V(L \sin \theta + D \cos \theta),$$

while the work expended in producing this is

$$2\pi rn(L \cos \theta - D \sin \theta)$$

Representing the efficiency for that element as η, the ratio of these two quantities

$$\eta = \frac{V}{2\pi rn} \frac{L \cos \theta - D \sin \theta}{L \sin \theta + D \cos \theta}$$
$$= \frac{V}{2\pi rn} \cot (\Phi + \theta)$$
$$\text{where } \cot \Phi = L/D$$

For a section at a given radius from the boss, V, n and r are specified so that θ is a fixed quantity, but Φ is a variable upon which depends the efficiency η of the element. It can easily be shown that η will be a maximum when — is a maximum and consequently when Φ is a minimum or $\cot \Phi$ is a maximum. It follows that maximum efficiency for each element will be obtained by selecting the appropriate high value of L/D. There are two distinct conclusions that may be adopted on the basis of this theory to insure an efficient propeller blade:

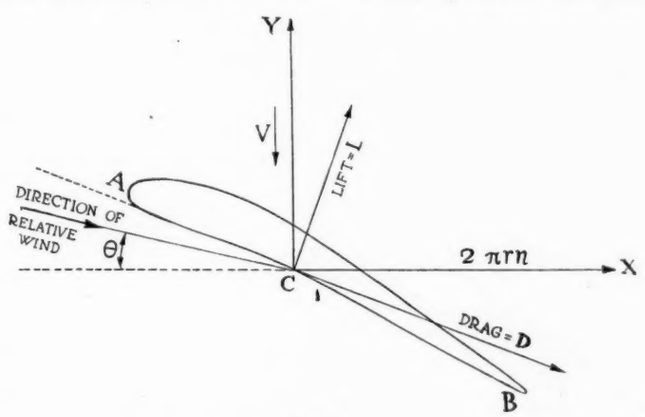


Fig. 3

(a) Only such aerofoil sections must be selected as sections for a propeller as give a very high value for the ratio of L/D.

(b) When the selection of the section has been made the propeller must be designed so that when in motion each element meets the relative wind at the angle of attack corresponding to the maximum value of the L/D ratio.

As a first rough guide in the design of a blade these two principles may be accepted as a starting point. What modifications must be introduced to allow for the various factors that have been seen may vitiate the general theory

will be shortly considered. For the moment it is necessary to understand clearly a fundamental assumption that has been made in the analysis so far. The mathematics has determined the conditions that must be satisfied by each element in order that the *element* may be working at maximum efficiency; it does not follow that if each element satisfies these conditions independently that the composite of elements—the blade as a whole—will equally be one of maximum efficiency, for clearly if one element be less efficient than another, the total efficiency of the two as a combination could be increased by devoting energy expended on the less efficient component to the more efficient one, thereby gaining in thrust for the same expenditure of power. Once more, however, we may ignore this for the moment in order to secure a starting point.

A first check on the validity of the aerofoil theory for propellers was made by accurately measuring up a two-

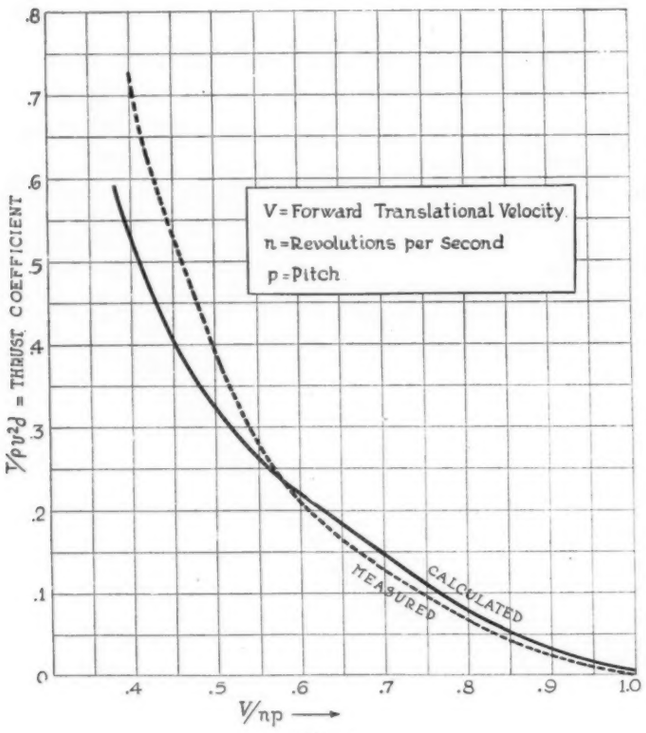


Fig. 4

bladed propeller for contours at six sections along its radius. Six aerofoils of the same contours were then tested in a wind channel for lift and drag at the same angles of attack as the corresponding sections. This had perforce to be done at a much lower value of the wind speed than that actually occurring in the rotation of the propeller, but a fairly accurate prediction of the forces at the actual speed of rotation could be carried out from the wind channel tests. The results obtained, estimated as the forces per unit length of the propeller blades, were integrated up to give the thrust torque and efficiency and compared with the actual values of these quantities as derived from a direct experiment on the propeller. The results obtained are plotted in Figs. 4, 5 and 6 and indicate clearly that the method may be relied upon to give at least a very good first approximation to the forces originated. The extent of the discrepancies may in fact be regarded as a measure of the effects produced by the various factors already enumerated and so far ignored.

The most important of these, and the same one that can be very largely allowed for in the design of a propeller, is that which relates to the effect of "inflow," the modifica-

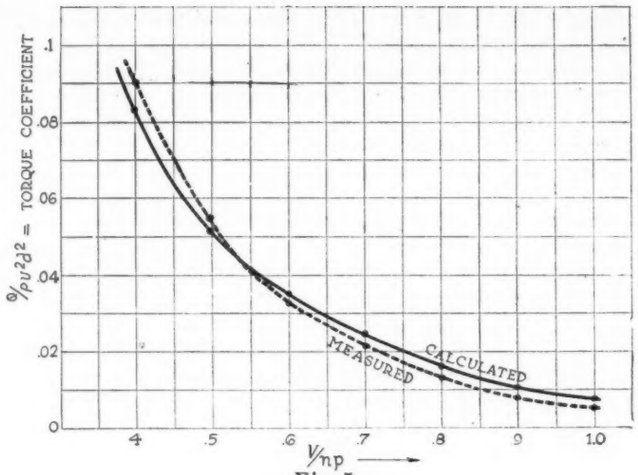


Fig. 5

tions that require to be introduced on account of the fact that the rotational motion of the blades is such as to accelerate the inflowing air well above that of the relative speed of the propeller and machine as a whole to that of the air at a distance. How this will affect the estimate of the forces on the elements in the foregoing theory is clear when it is noted that if v be this additional inflow velocity at the propeller disc given to the air ahead by the "suck" of the propeller, then the relative forward speed of machine to air at the blade is $V + v$, and the corrected relative speed of blade element to air, upon which the forces are to be estimated, will now be

$$\sqrt{(V+v)^2 + (2\pi rn)^2}$$

and the angle of attack given by

$$\tan \theta = (V+v)/2\pi rn$$

The problem of allowing for "inflow" in any propeller reduces itself therefore to determining some method of estimating v, the inflow velocity, before the propeller is designed. During the war a considerable amount of time and thought has been devoted to this question, both in its theoretical and experimental aspects, and as far as practical design is concerned the principal difficulties have been overcome. To understand how this has been accomplished we must recognize in the first place that if the velocity of

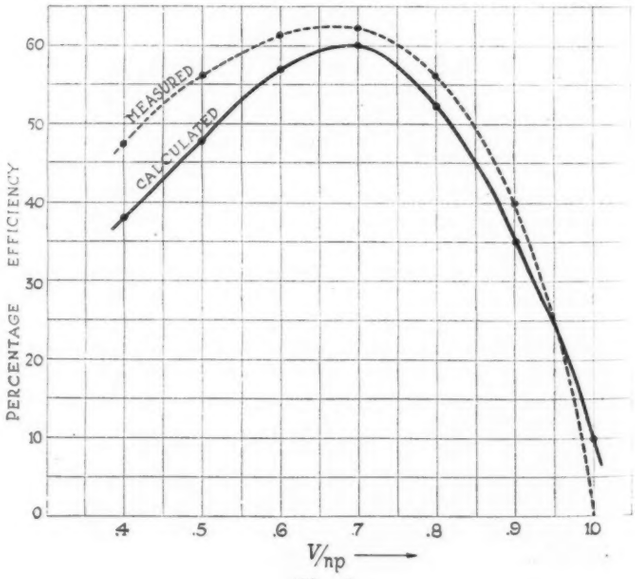


Fig. 6

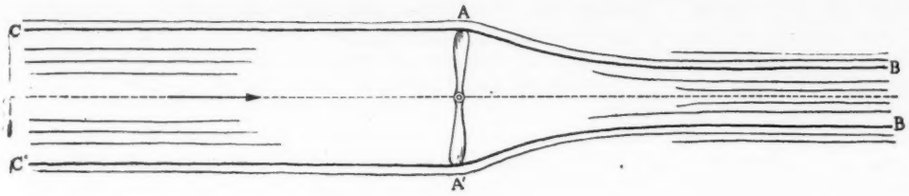


Fig. 7

inflow for a series of propellers could be measured experimentally, an empirical law could probably be framed, relating it with such initially known factors as the thrust of the propeller and the forward speed V of the machine. These are quantities known before the propeller is designed, the thrust being equal to the drag on the remainder of the machine, but unfortunately the inflow velocity increases rapidly as the propeller disc is approached, and close to the disc direct experimental measurements are too difficult to perform with any accuracy.

On the other hand, certain other experimental facts can be determined with considerable precision, and on the basis of these the inflow velocity can be estimated to an accuracy sufficient for practical design. Explorations by means of a Pitot tube and a yawmeter in the neighborhood of a rotating propeller have indicated that roughly the flow of air through and about the actuator disc AA is of the nature shown in Fig. 7, where a clear surface of separation is found in the rear of the propeller forming a well-defined slip stream bounded by $ABA'B'$. The motion in the slip stream is by no means simple. In general, in the immediate rear of the propeller blades it is in a state of violent turbulence, with both forward and rotational components, but further down the stream, where it tapers to a constant diameter, the rotational energy is small in comparison with the direct translational energy. In effect, what we may consider as happening is that a column of air of cross section CC' is operated upon by a

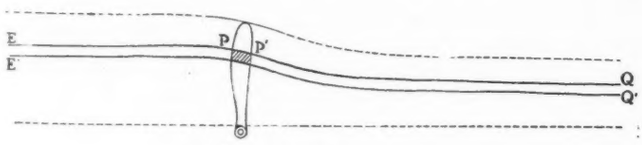


Fig. 8

thrust distributed in some unknown manner along AA' and discharged in a column of section BB'. We may even go further than that; we may say that an annulus of the fluid, Fig. 8, EE' is operated upon by the propeller element PP' and discharged along QQ'. If we can assume that these conditions are approximately satisfied, it is clear it will not be rigorously true that the annulus may be separated in this manner from the rest of the fluid—two equations relating the inflow velocity, outflow velocity and thrust on the element, or thrust grading may be constructed. These relations will state that the momentum acquired by the fluid in passing from EE' to QQ' is due to the pressure along the annulus and the thrust of the element PP', and that the increase kinetic energy is due to the work done by this elemental thrust.

From these equations it can easily be shown in the first place that the additional inflow velocity at PP' is equal to one-half the additional velocity acquired by the time the fluid has reached QQ', if it be assumed that this increment in velocity is uniform over the propeller disc. That it cannot be uniform is evident from the fact that the actual velocity of the air at the center of the boss must be nil; nevertheless, if we had nothing further to go by, it would give an approximate idea of how rapidly the air coming from CC' (Fig. 7) accelerates to and average speed at BB'.

Of the three unknown quantities in the two equations, fortunately two at least may be directly measured by experiment; these are the velocity distribution in the slip stream at BB', and the thrust grading or thrust per unit length of the propeller. Experiments conducted to determine the velocity distribution in the slip stream have provided certain useful and interesting information. The slip stream tapers down to its minimum diameter very rapidly after passing through the actuator disc, reaching a diameter of slightly less than three-fourths that of the propeller at a distance of half a diameter from it. Within this region the slip stream is very sharply defined, but

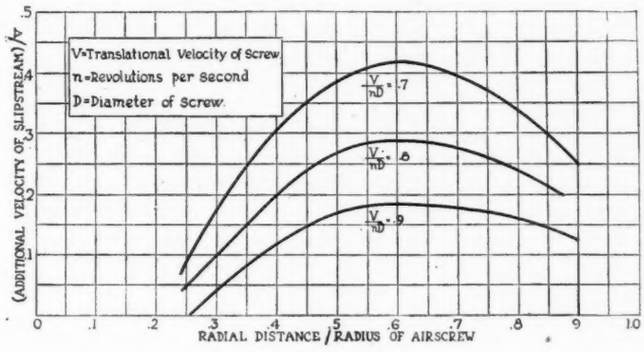


Fig. 9

beyond this the outer surface becomes more indistinct and more difficult to separate from the rest of the surrounding air. The actual distribution in velocity is shown roughly in Fig. 9 in general form, although the magnitude of the velocities at each point will depend on the particular value of V/nD at which the propeller is running. V is the translational velocity of the propeller, n is the number of revolutions per second and d the diameter. The whole expression V/nD is a non-dimensional quantity in terms of which the properties of any propeller may be conveniently expressed.

The additional experimental fact that may conveniently be obtained is the thrust gradient or thrust per unit length of the propeller blade. The streamlines which pass through the actuator disc acquire an exceedingly rapid increase in pressure as a result of the thrust of the element of the

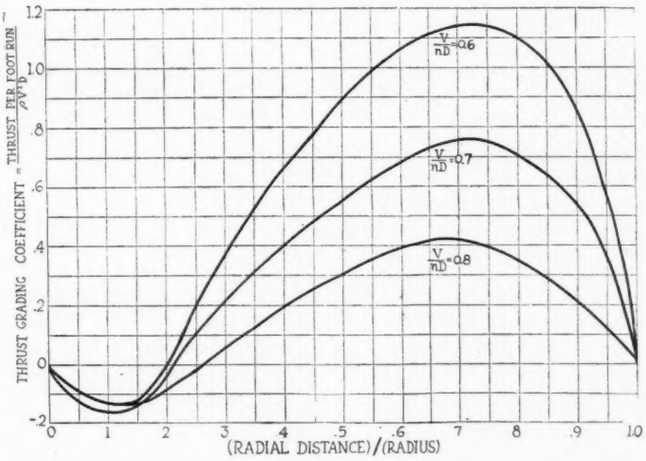


Fig. 10

propeller in the immediate neighborhood. It may be assumed, therefore, that if the pressure fore and aft of the disc of propulsion be measured, the increase in pressure registered will give an estimate of the thrust gradient. This has been caried through, and the results have indicated that in most cases the curve shown in Fig. 10 gives a close representation of the facts. Once more, of course, the position and form of the curves depend on the value of V/nD at which the experiment is conducted. In the investigations from which these were derived the thrust grading curves were integrated up as a check on the accuracy to determine how closely the thrust obtained by integration coincided with that actually measured by a direct test. The agreement was eminently satisfactory.

On these experimental factors as a basis, the application to the indicated theory is simple, and leads to the conclusion that, although the ratio of "outflow velocity" to "inflow velocity" for each portion of the slip stream and its corresponding portion of propeller blade will vary both with position and with the value of V/nD, at no point does the ratio of the absolute velocity of outflow to the absolute velocity of inflow differ materially from 1.7. From these considerations it becomes evident that for all practical purposes it is sufficient to assume that the additional inflow velocity can be represented as a parabolic function of the distance of each element from the propeller axis, zero at the boss, rising to a maximum of approximately one-fourth the translational velocity at a point about three-fourths radius from the boss and falling to one-sixth the translational velocity or less toward the tip. A rough curve satisfying these requirements may be taken as sufficiently accurate, for it should be remembered that modifications due to inflow are, after all, merely corrections.

As far as aerodynamic considerations are concerned, these are the principal factors which a designer must have in his hands, but the order and detailed methods whereby he may apply them are largely a question of experience and individual practice. Generally, the dimensions and build of the machine determine for him the diameter, thrust and forward velocity. A thrust grading curve of the form described in Fig. 10 may then be constructed as a starting point, but such that when integrated up, provides the required total thrust. From a collection of aerofoil data suitable for propeller design a set may be selected such as to provide the appropriate thrust gradient according to the principles enunciated above. The forces on these elementary aerofoils must be obtained from the data on the assumption that the elements are set at the angles as corrected for the additional inflow. The breadth or chord of these elements and their thickness are, however, not principally an aerodynamic question. The question of plan form must be decided partly on the basis of the experience of previous propellers of known performance and partly on the question of the stresses originated during flight.

The bending moments at each section of the blade due to centrifugal forces are easily evaluated, and by a suitable alignment of the centers of gravity of the elements the bending moments due to the wind forces may be made to operate in opposition to those due to centrifugal forces. In general a propeller suitable for high-speed work will taper rapidly toward the tip, while one adapted for lower speed, where the stresses at the ends may not be so great, will be square tipped.

British Solid Band Tire Sizes

A STUDY of the tables given herewith indicates that the British non-standard sizes of solid band tires approximate more nearly to the S. A. E. nominal standards than do those British sizes which have been passed as standard by the British Engineering Standards Committee. It should be noted that British and American sizes are not interchangeable, in the sense that they do not fit bands or felloes of similar dimensions. British measurements are metrical, ours are based on inches.

It is particularly significant to observe that despite the British efforts to reduce the number of standard sizes in solid tires, the total number listed under this head are no fewer than 34. There are but three S. A. E. standard nominal tire diameters. Including these three, respectively 34, 36 and 40 in., there are altogether only seven nominal diameters scheduled by the Society of Automotive Engineers as representing the solid tires of band type in general use. Including British non-standards with the standard sizes gives a grand total of 58, as against the American seven. Some British tire manufacturers make solid band tires to fit American rims and American firms make for British rims.

BRITISH STANDARD SIZES

Tire Section m/m.	Rim Diameter m/m.	Suggested Maximum Load per Tire (cwt.)	Tire Section m/m.	Rim Diameter m/m.	Suggested Maximum Load per Tire (cwt.)
75 (3 in.)	by 720..	10	120 (4¾ in.)	by 771..	29
75 (3 in.)	by 741..	10	120 (4¾ in.)	by 850..	29
85 (3¼ in.)	by 720..	13	120 (4¾ in.)	by 881..	29
90 (3½ in.)	by 670..	15	130 (5⅛ in.)	by 720..	31
90 (3½ in.)	by 720..	15	130 (5⅛ in.)	by 850..	31
90 (3½ in.)	by 771..	15	140 (5½ in.)	by 670..	33½
90 (3½ in.)	by 881..	15	140 (5½ in.)	by 720..	33½
100 (4 in.)	by 670..	20	140 (5½ in.)	by 771..	33½
100 (4 in.)	by 720..	20	140 (5½ in.)	by 850..	33½
100 (4 in.)	by 771..	20	140 (5½ in.)	by 881..	33½
100 (4 in.)	by 850..	20	160 (6¼ in.)	by 670..	40
100 (4 in.)	by 881..	20	160 (6¼ in.)	by 720..	40
110 (4½ in.)	by 670..	23	160 (6¼ in.)	by 771..	40
110 (4½ in.)	by 720..	23	160 (6¼ in.)	by 850..	40
110 (4½ in.)	by 771..	23	180 (7⅛ in.)	by 670..	42
110 (4½ in.)	by 850..	23	180 (7⅛ in.)	by 720..	42
120 (4¾ in.)	by 741..	29	180 (7⅛ in.)	by 771..	42

BRITISH NON-STANDARD SIZES

Tire Section m/m.		Rim Diameter m/m.		Suggested Maximum Load per Tire (cwt.)
75 (3 in.)	by 660 to fit rims	545	.....	10
75 (3 in.)	by 760 to fit rims	645.5	.....	10
75 (3 in.)	by 810 to fit rims	687	.....	10
75 (3 in.)	by 820 to fit rims	696.5	.....	10
75 (3 in.)	by 865 to fit rims	747.5	.....	10
75 (3 in.)	by 905 to fit rims	783	.....	10
90 (3½ in.)	by 760 to fit rims	621	.....	15
90 (3½ in.)	by 830 to fit rims	686	.....	15
90 (3½ in.)	by 900 to fit rims	754	.....	15
90 (3½ in.)	by 955 to fit rims	815	.....	15
100 (4 in.)	by 770 to fit rims	621	.....	20
100 (4 in.)	by 830 to fit rims	686	.....	20
100 (4 in.)	by 850 to fit rims	701	.....	20
100 (4 in.)	by 900 to fit rims	751	.....	20
100 (4 in.)	by 965 to fit rims	814	.....	20
100 (4 in.)	by 1050 to fit rims	801	.....	20
100 (4 in.)	by 1220 to fit rims	1064	.....	20
120 (4¾ in.)	by 820 to fit rims	660	.....	29
120 (4¾ in.)	by 850 to fit rims	701	.....	29
120 (4¾ in.)	by 950 to fit rims	789	.....	29
140 (5½ in.)	by 850 to fit rims	680	.....	33
140 (5½ in.)	by 1050 to fit rims	868	.....	33
160 (6¼ in.)	by 1060 to fit rims	860	.....	40
160 (6¼ in.)	by 1070 to fit rims	871	.....	40

It's Trucks and Tractors, Not Cars, That Mexico Needs

If you are interested in the trade with Mexico, here is something you will be interested in. Mexico has been generally known as the careless buyer of elaborate, special job cars or of used cars. But it appears that it is trucks and tractors that the Mexican leaders want that country to have. The Mexican government is willing to aid the manufacturer who will place these vehicles in that country. This interview with an agent of the Department of Development is worth your while.

By Harry Dunn

MEXICO, with 800,000 square miles of territory and 16,000,000 inhabitants, wants tractors for her hundreds of thousands of acres of grain lands, her thousands of acres of sugar plantations, and her huge bean fields. She needs motor trucks to transport her crops and her merchandise where the railroads do not reach, great sections of the country now served only by mule-trains and by slow-moving boats on the natural watercourses. She looks to the automobile manufacturers of the United States to furnish these automotive vehicles and to American distributers to put them into service.

Demonstrations of both tractors and trucks can be arranged through the Mexican Government, and the banks in Mexico City, Guadalajara, Monterey, and other cities of the Southern republic will attend to the financing of sales.

Little is known of the use of tractors and trucks except in the northern part of Mexico, but crops are large, peace is being restored and the field for the sale of these modern utilities of agriculture and commerce is one of the largest in the New World.

These are the opinions of Alberto Garcia Cadena, technical agent of the Department of Fomento (Development) of the Mexican Government, who recently was in New Orleans on his way to the interior of Louisiana, Mississippi, Alabama and Florida to study cotton, sugar, rice and sweet potato production in those states. Cadena had just completed a tour of the agricultural states of Mexico, prior to coming to the United States, to learn just what could be done to increase farm production and to develop agricultural methods most rapidly in his own country.

This picture explains why motor cars are not popular outside of cities in Mexico

"The large ranches, formerly devoted to the pasture of hundreds of thousands of cattle, and therefore non-productive in an agricultural way, have been cut up by the simple expedient of taxing non-productive lands," said Cadena. "This taxation has compelled the owners of these huge tracts to give the small farmer—and the large farmer, too—a chance by selling their lands in blocks of 20 to 200 or 300 acres. The result, to take one state as an example, has been that in Sonora, for the first time in the history of Mexico, more corn and beans were produced this last crop than the state could consume, and Sonora became an exporter of these foodstuffs, not alone to other Mexican states, but to the United States as well.

"This production could have been doubled had we had tractors to cultivate the fields; all of it could have been sold in Mexico to people of other states who really needed food, if we had had tractors to haul it. Not having these tractors, the farmers of Sonora had to sell their over-production in markets to which they had railroad transportation, which is to say, northward.

"Sonora, which is one of the most advanced states, agriculturally, of Mexico, adjoins your states of Arizona and New Mexico, yet, so far as I know, no attempt has been made to introduce tractors or trucks there by the manufacturers or dealers of the United States. There are three trucks in Guaymas, the chief port of Sonora; there are two or three in Hermosillo, the capital, and there are two down on a large foreign agricultural project on the Mayo and Yaqui rivers. With the exception of the last-named, these trucks are used only in city trade, and are of no use to the agricultural industry of the state.

"What we need in Sonora, and in other northern corn-producing states of Mexico, is a series of demonstrations of tractors and trucks. With the exception of Chihuahua, in which there is still some revolutionary disturbance, the

governments of these northern states will provide every facility for such demonstrations, and the banks in their principal cities will provide guarantees and facilities for the financing of the sales of these implements.

"Coahuila, Nuevo Leon, the northern part of Tamaulipas, San Luis Potosi, Michoacan, Guanajuato, and other states in the north and north-central part of Mexico have as great or greater agricultural resources than Sonora, but their large farms are virtually undeveloped because of the slow methods of horse and mule power used in their farming. Most of this country is level, and the use of tractors and trucks, regardless of the condition of the highways, is feasible for nearly 300 miles south of the United States border.

"Right here, however, let me say a word of warning about passenger automobiles. They are few improved highways outside the larger cities of Mexico, and the field for passenger cars is limited, until such time as the governments plan for the development of a good-roads system can be carried ahead.

"There is a limited opportunity for American passenger cars in Mexico City, Guadalajara, San Luis Potosi, Monterey, Hermosillo, Chihuahua City, Tampico, Vera Cruz, Merida and one or two other cities, most of which already have agencies for American cars which satisfy the demand.

"The great undeveloped, unexploited field is for the tractor and the truck, but they must be demonstrated, the people must be shown the advantages of these vehicles and men must be trained to operate them.

"Expenditures for introduction will not be heavy, and the profits will be large, for from my recent trip through Mexico I would say that, as present agricultural conditions stand, without further development, 10,000 tractors could be sold in the agricultural regions of Mexico alone. Level country, arable land, no bogs, crops easy to cultivate, and people eager to get all available improvements to increase their production are the factors which come at once to the aid of the tractor or truck salesman—more to the former than to the latter, inasmuch as the tractor can be used as a truck as well. The truck demand is greater in the south of Mexico than in the agricultural regions of the north.

"The bogey of long-time credits, which seems to have held back so many American firms in Mexico in times past, is virtually obviated by the willingness of state and private banks to assist in financing such sales. I believe the company which demonstrates the ability of its tractor in agricultural Mexico could not only make large sales, but could get immediate cash, or at most 30-day collections, guaranteed through these banks.

"Where crops are abundant, where work is plentiful at good wages, peace prevails, and I believe the American tractor, well and capably introduced, will prove a large factor in making and keeping peace in those small areas of Mexico which are still disturbed by robbers and rebels.

"The American tractor or truck demonstrator and salesman, however, *must speak Spanish.* It has been the experience of every foreign salesman who has ever gone into Latin America that he accomplished virtually nothing unless he had full command of the language. You cannot introduce, demonstrate and sell a new article through an interpreter.

"This is the reason the French salesmen of passenger automobiles sold so many more cars in Mexico City and other centers of Mexican population, up to 1912, than did the American salesmen. The Frenchmen either employed native firms to do their selling or sent their own salesmen who spoke Spanish fluently. The American salesman, whether he be distributing tractors or toothpicks, must follow the same method.

"In Central Mexico, through parts of the states of Guanajuato, Puebla, Hidalgo, Mexico, Guerrero and others, where mining is one of the main industries, the motor truck is needed, and needed badly, to take the place of the pack-mule train or the slow six to ten-mule wagon.

"Distribution and demonstration here is the easiest of all parts of Mexico, for trucks can be brought in through Vera Cruz or Tampico, ports on the Gulf of Mexico coast, or through Mazatlan or Manzanillo on the west coast. Also, the mining companies, especially the larger corporations, have constructed fairly good roads from their settlements to the smelters or to railroad connections.

"I expect to see motor truck service established between many of these mining settlements and the cities, the more especially because Mexico, while possessed of three trunk lines of railroad, is lacking in short, cross-country

Why trucks are needed. There are 20 such markets in Mexico City and all of the wares are brought in on donkeys or crude vehicles

lines, connecting important mining and farming centers. Roads are easy to construct in the soil of the Mexican plateau, which ranges in altitude from 2500 to 10,000 ft., Mexico City being 7140 ft. 'up in the air.' Manufacturers and demonstrators of trucks for this section of Mexico should bear this question of altitude and its effect on their engines in mind when selling or demonstrating these vehicles.

"Further to the south, through lower Vera Cruz, lower Mexico, Morelos, Tabasco, Chaipas, Oaxaca and other southern states, lie the sugar, rice and coffee plantations, and here the tractor is needed. This is a soft country, with thick jungle, heavy rains and many watercourses. In fact, the main means of transportation in that region is by water, except across the Isthmus of Tehuantepec, where a railroad connects Puerto Mexico, on the east, with Salina Cruz on the west, with northward connection at Santa Lucrecia, by way of the Vera Cruz al Istmo railroad.

"Water transportation, however, is slow, as is also mule train, and there are corduroy roads from ranch to ranch through the greater part of this country. The truck which goes in there to work will see hard service, as will also the tractor, and must be built for it. I have seen nothing so severe in the southern and more tropical parts of the United States, but the few tractors in use on some of the larger sugar *haciendas* and coffee *fincas* there are giving good service, so much so that there is large field for the introduction of others.

"In the states of Tabasco and Chiapas, whence comes by far the larger part of the mahogany, rosewood and New World ebony, the waterways are used to float the timber down to the ships in the various ports, notably Frontera and Puerto Mexico. Apparently this is so much cheaper than the use of trucks or tractors in getting out this wood that there is not much field for either one of these motor vehicles there just now. The state of Yucatan, which is a large, flat, coral reef, over which a truck can be driven in any direction, produces nearly $10,000,000 worth of henequen fibre (sisal) annually, yet this huge crop is handled mainly in wagons and on the backs of mules. There should be a good, though limited field, for trucks and tractors with trailers there.

"Around the larger cities there is need for the smaller trucks, of one-half to one ton capacity, for the handling of vegetables, farm products, meat and fish. The cities of Mexico are fed largely through public markets, which are still supplied by the omnipresent mule train and a few two-wheeled, mule-drawn carts.

"Good demonstrations of the advantages of the small truck undoubtedly would establish this means of transportation around all these cities, of which there are at least a dozen in the republic large enough to support fleets of ten to twenty-five such trucks. The only thing Mexico needs to become a regular field for American trucks and tractors is to be properly introduced to them."

Single Government Department for Aeronautics Urged by Mission

(*Continued from page* 303)

a national and international character, due to the great distances covered, and to the speed with which it links together far distant points. This principle has been so clearly understood that an international agreement has been established between the Allies and their associates, by which international flight of aircraft has been provided for in a far-sighted manner, thus making immediately possible the fight of private craft from one country to another on a basis as clearly defined by law as that governing the movement of steamships, except, of course, that the practice of ages of ship travel is missing in the case of aircraft.

5. The development of aviation is progressing so rapidly at this time that it is difficult even for those in close touch with it to keep up with its progress. During the past two months the Atlantic has been crossed four times by aircraft; first, by a seaplane of the American Navy; second, by an airplane of Great Britain, and finally, by an airship of Great Britain, which has twice demonstrated its ability to fly between England and America. All of this has been accomplished without the loss of a single life. Airships are now building in England which will be able to carry from five to ten tons of mail, in addition to the necessary fuel and crew, and cross the Atlantic from London to New York, in one-half the time made by the fastest steamships. Who can say such transportation facilities will not greatly serve civilization, and be of immeasurable value to our own country if properly developed and used?

6. Already lines of aerial transportation are being used in England and France in a small way for commercial purposes, but the distances in these countries are so short that relatively little advantage can be gained, so such ventures will develop slowly. A daily service from London to Paris has been in operation for some time, and promises to be quite serviceable as soon as it can be relieved of its war time military supervision. Other lines now in operation are from Paris to Lille and Brussels and from Paris to various points in Alsace Lorraine and German occupied territory. Among other plans English private interests are projecting airplane lines from Cairo to the Cape and Cairo to Bombay, and French interests are planning to run a line to Algeria and Morocco. These lines will carry mail, passengers, and express, and it is expected that they will materially shorten the time between European centers and their far-distant terminals. The United States Post Office Department has carried mail by airplane from New York to Washington for over a year with a record of nearly 100 per cent delivery at each end every day. It is now inaugurating a line from New York to Chicago which will shorten the mail time between these two points to about one-half. It is also projecting a two-day service from New York to San Francisco. England is already desirous of organizing with the United States a transatlantic airship line for mail service which would give a five-day mail service from London to San Francisco. Such a service is entirely possible at this time, and its inauguration depends only upon adequate encouragement and financial support.

7. The risks involved in these ventures, due to unknown conditions of the atmosphere, imperfections of equipment, etc., are still so great as to make them impracticable from the point of view of private enterprise, undertaken for a profit. If left entirely to such private enterprise, aerial transportation will develop slowly and with many losses and backward steps, as did the steamship, the railroad, and the automobile, each of which, however, has ultimately become a vital factor in our civilization.

8. One of the striking features of our investigation in Europe was the unanimous belief that the use of aircraft in warfare and for national defense would continue to increase and that in the next war, whenever it might come, aircraft would be a far more vital factor even than it has been in this war. One of the greatest military authorities in Europe stated that in his opinion the first battle of the next great war would be in the air, and would very nearly decide which side would win, in that the side winning in

the air would immediately have access to all of its enemy's sources of supply and production, and would quickly cripple them by air raids upon an enormous scale. The opinion was everywhere expressed that the development of aircraft for purposes of national defense must continue and that sufficient flying and production facilities and personnel must be maintained at all times to insure an adequate supply in case of need. Due to the complicated and delicate nature of such equipment, to its rapid depreciation in use, and to its constant obsolescence, the expense involved in such a program would be very great, in fact almost prohibitive in peace times.

9. The existence of an aerial transportation industry with a great commercial air fleet and of a strong production industry would greatly decrease the need for strictly military equipment and resources, in that practically all of the aircraft and landing field facilities and personnel, and the manufacturing and maintenance facilities and personnel employed by such commercial activities, would be available as a reserve in time of war. It is evident, therefore, that the most economical way to develop a strong air service for national defense is to encourage by every means possible the use of aircraft for commercial purposes, and thereby build up a commercial fleet at relatively small expense to the Government, which would effectively supplement its strictly military equipment, in time of need. America's experience during the war has proven conclusively that aircraft facilities and personnel, and particularly production facilities and technical personnel, cannot be obtained upon short notice, but only by long and continued experience and at great expense.

10. America's production industry reached large proportions during the war, but since the signing of the armistice it has shrunken to a very small volume. Unless immediate attention is given to its conservation, it will practically disappear, and a considerable portion of the great sums expended in its development will have been spent fruitlessly. This industry does not require a large volume of business to keep it alive and healthy, but it does require a steady and dependable demand, otherwise private capital and enterprise will not long remain interested.

RECOMMENDATIONS

Upon the basis of these conclusions, we offer the following plan for stimulating the development of commercial aviation as an aid to national defense, and as a response to the demand that is already developing for improved commercial transportation through the use of aircraft.

A.—The Civil Aviation Division of the National Air Service should establish, with the advice of the Army and Navy, and the Divisions of Military and Naval Aeronautics, a series of flying routes throughout the United States and its possessions and to contiguous foreign countries, which will be of military and commercial value. It should also prepare and publish maps and descriptions of each of these routes, suitable for the use of fliers.

B.—There should be provided at national expense certain flying fields in strategic locations, and suitable for military purposes, and encouragement should be given to the various states and municipalities to provide flying fields upon all flying routes, at points found desirable, thus eliminating the necessity for private ownership of flying fields except for strictly private use. Hangars should be provided at each flying field by the governmental authority owning the field (that is, federal, state or municipal), or where such fields are used constantly by private interests, they should be permitted to provide their own hangars immediately adjacent to and opening upon such flying fields.

The operation and use of such flying fields should be controlled by federal law, so as to obtain uniformity throughout the nation and conformity with international regulations.

C.—All flying routes and flying fields should be equipped at national expense with signalling and communication systems, including wireless telegraphy, wireless telephony, and searchlights, to thoroughly safeguard and guide aircraft in flight. The Government's attitude in this matter should be the same as that maintained toward shipping in its lighthouse and coast patrol service. The operation of signalling and communication equipment should be controlled by federal law for the reasons indicated under item "B."

D.—A meteorological service should be developed to provide fliers and other aviation interests with accurate weather reports and other atmospheric data necessary to govern their activities intelligently. The value of this service to commercial aviation cannot be overestimated as it will go far toward establishing reliability and safety of service, just as weather reports are of immeasurable value to ocean and lake transportation.

E.—Training facilities should be provided at various localities throughout the country, either at Government expense, or by private enterprise under Government regulation, with guarantees from the Government of a sufficient number of students to cover expenses. Such guarantees could be given by the Government without undue expense if it used such schools for the preliminary training of its military personnel. Such a plan would encourage private enterprise to provide facilities for the training of the personnel needed for commercial requirements, which personnel in turn should become a permanent reserve for military requirements in time of need. There should be established at least one school for the teaching of aerodynamics and other branches of the science of aeronautics as recommended under the heading "Organization." Encouragement should be offered to universities throughout the country to establish departments of aeronautical science.

F.—The Government should encourage the development of new design and aeronautical technique for commercial purposes along the lines recommended under the heading "Technical Development."

G.—The Department of Aeronautics should maintain the closest possible relations with all civilized nations in determining and applying the rules and regulations which will govern the international use of aircraft, and there should be developed as rapidly as is consistent with proper consideration a body of Federal law governing the use and airworthiness of aircraft for commercial purposes, which will safeguard life and property and promote the commercial usage of aerial transportation.

In order that commercial aviation may be helped and not hindered by such legal restrictions, it is of vital importance that aerial transportation be recognized at once as an element of interstate commerce and be made subject to one body of *Federal* law applying uniformly throughout all of the United States. It will thereby avoid the complications of individual state control which have proven to be such a handicap to railroad and automobile operation.

H.—Insurance of aircraft and its personnel against all kinds of hazards and risks involved should be encouraged in every way. The cost of such insurance should be kept as low as is consistent with the risks involved.

I.—Encouragement should be given to the organization of private enterprises for carrying on aerial transportation. This encouragement might well be in the form of payment for the carrying of mail and expressage, and of guarantees as to the volume of such business. Compensation might be paid to such enterprises for keeping their facilities available for use in time of war.

Guarantees of this kind, coupled with opportunity to insure against loss by accident, should make privately

operated transportation lines a commercial possibility, but if it is found that private enterprise does not respond to such encouragement, then the Government should undertake certain transportation ventures on its own account and should continue to operate such lines until they are proven commercially successful. Ultimately they should be sold to private enterprises on such terms as would permit of successful operation, as it is not believed that commercial aviation will ever be successfully developed entirely under Government control.

J.—The remaining aircraft production industry should be conserved and kept in a healthy condition by a well defined and continuing program of production for military purposes, over a period of years. This policy should be continued until the commercial demand is adequate to support an industry of sufficient proportions to form an effective nucleus upon which can be built a war time production in case of need.

Technical Development

With reference to technical development, your mission in submitting its recommendations bases the following conclusions on a knowledge of conditions existing in the United States and upon extensive investigations conducted abroad:

(1) (a) The mission visited plants making or experimenting in materials, as follows:

France

Breguet	Bleriot	Renault
Farman	Hispano-Suisa	Nieuport
S.P.A.D.	Morans-Saulnier	

Italy

Ansaldo	Caproni	Isotta (plant closed by strike)
Macchi	Pomilio	F.I.A.T.

England

Handley-Page	Bristol	Sopwith
B.A.T.	Vickers-Vimy	Grahame-White
Rolls-Royce	Cosmos	A.B.C.
Phoenix Dynamo		Armstrong-Whitworth

(b) The mission has visited laboratory and experimental shops, as follows:

Institute Sperimentale Aeroniutico, Rome.
Eiffel Laborateties, Paris.
R. A. Factory, Farnsborough, England.
Isle of Grain Naval Experimental Station, England.
Pulham Dirigible Station, England.
Aeroplane Station, Craspiano, Italy.
Dirigible Station, Craspiano, Italy.

(c) The mission has interviewed the following Governmental official and industrial officers upon the subject of the proper organization, scope and equipment of the Technical Division:

England

General E. L. Ellington, Head of Department of Design, London, Royal Air Force.
Sir Percy Herouard, Managing Director, Armstrong-Whitworth Co., 8 George Street, Westminster, London.
General Graves, R.A.F. Representative, with British Peace Commission, Paris.
General Brooke-Popham, Director of Research, London.
Mr. Holt Thomas, London.
Mr. Douglass Vickers, Vickers, Ltd., London.
Mr. Grahame-White, Grahame-White Aircraft Co., London.
Sir Samuel Waring, London.

France

Major d'Aiguillon, Interministeriello de l'Aviation Civile, Paris.
Mr. Louis Breguet, manufacturer, Breguet et Cie., Cic des Messageries Aeriennes, Paris.
Mr. Cacquot, former Chief Technical Section, Department Military Aeronautics, Paris.
Colonel Dorand, Department Military Aeronautics, Paris.
General Duval, Director Military Aeronautics, Paris.
Mr. Jacques Louis Dumesnil, Deputy, former Under-Secretary French Aeronautics.
Captain de l'Estrade, Technical Service, French Military Aeronautics.
Mr. Pierre Etienne Flandin, Deputy, former Chief Inter-Allied Organization of French Aeronautics, Paris.
Mr. Messaguer, head of Hispano-Suisa Co., Paris.
Mr. Maurice de St. Blanchard, Secretary Aero Club de France.
Mr. Daniel Vincent, Deputy Director, former Under-Secretary of Aviation, Paris.

Italy

Commander Caldara, Head of Aviation, Technical Section, Rome.
Signor Casati, designer, Caproni Co., Milan.
Lt. Col. Ferduzio, designer of S.V.A. Rome Aeronautics, Rome.
Colonel Crocco, Director of Institute Sperimentale.
Colonel Guidoni, Italian Aeronautical Mission.
Admiral Orsini, Ministry of Italian Aviation, Rome.

2. The form of technical organization and control recommended by your mission differs materially from the controlling organizations in Italy, France or England. Inasmuch as, for some time at least, military, naval and departmental flying seems likely to lead in the development of the art, your mission desires to lay emphasis upon the necessity of having these departments strongly represented in the operations of the Technical Division so that they shall be materially helped and not hindered in their research, experiment and development.

To the same end, we are of the opinion that in England and France, due to the closeness of the war, the Technical Division is at present dominated by military personnel, but the opinion is unanimous that, as time goes on, civil personnel will supersede military in this Division. General Ellington, England, expressed this opinion flatly and General Brooke-Popham, Director of Research, England, holds the same belief. In the Royal Aircraft Factory, at Farnsborough, civil requirements are already overtaking military and naval. It has, therefore, been deemed wise to take the ultimate step at the outset in America, and a civilian head, of the type now earnestly sought in France and England, is recommended for America.

3. In equipment and personnel, England and France and Italy are maintaining their war strength in the Technical Division. At Farnsborough, we found a complete experimental plant, employing about 3000 men and women, and carrying on actively nearly every line of research, experiment and development in motor, planes, and accessories. More than a score of planes, rigged with apparatus for aero-dynamic experiment, were in the hangars and in the field. Physical and chemical laboratories seemed busy and fully manned. Estimating the lighter-than-air and the naval experimental and research personnel, it seems probable that the plant and the personnel engaged in the division in England is nearly, if not quite, equal to the entire trade in America at the present time. Obviously, this branch of aeronautics lies at the very foundation of the future, both military and civil, and to fail to bring it up to the standard of the world cannot help but mean dependence and mediocrity, or worse, in aeronautics in America.

4. The inclusion of such topics as armament (Ordnance), wireless (Signal Corps), instruments (Ad-

miralty), photography (Signal Corps), design and bombs (Ordnance), etc., has been found necessary in all countries. In reality, the design and supply of such appurtenances is left to the departments or bureaus specializing in them, but research and experiment and development, in methods of installation and use, is essentially a function of the Air Service Technical Division, and must be carried on by this Division, both in the laboratory, on the factory floor, and especially in the air, in the tank and on the field.

5. In all the European countries visited, we found that access to and use of the Government-owned facilities for development is established. The basis of such use varies, and can be adapted to the circumstances. In all countries, however, the principle is the same, namely, that private interests must obtain access to Government facilities, through the officers of the Division, so that new inventions, etc., shall pass the scrutiny and criticism of the Division heads before going into actual experimentation. In England, an attempt has been made to furnish facilities at cost, but to save overhead, a schedule of flat prices is being worked out.

6. In England and France, the question whether or not to design complete motors and machines no longer exists. France was forced to design aeroplanes in 1916, due to the failure of her private firms to meet the crisis created by the Fokker; but the immediate result appears to have been a quick return to the safer measures for encouraging the private designers to design and build, under the direction and assistance of the state. In England the complete design of aeroplanes ceased with the S. E. 5; and both Government officials and industrial officers offered ample testimony that the making of complete designs was a mistake and would not be repeated, due to its effect upon the private design departments. Without exception the manufacturers appear to take the view that it would be idle to complete by private efforts, if one division of the Government was designing and another division buying, as the Government would inevitably favor its own designers, even though not quite so good. The result of such a policy, therefore, would be to limit the number of sources from which useful designs can be obtained, and also to lower the standard of personnel in the design departments of private firms.

7. In 1918, Sir Arthur Duckham, then Director of Aircraft Supply for England, said:

> "As we all know, changes in design, unless they are actually for new types may be absolutely against production; most of our delays in production in this country and in the countries other than ours have been due to the effort to obtain too great perfection at too early a time."

Having this in mind, and having in mind also the disastrous effects upon production of similar causes in the United States, your mission asked explicit questions concerning the plan used by the Technical Division in England to minimize the result of such changes. The method is outlined as follows:

> "All changes made necessary by the fact that a machine or motor is dangerous to the flier or to the public are classed as Number I. These are imperative, and are ordered by the Director of Design without delay. No machine is allowed to be accepted or flown without such changes having been made.
>
> "Important changes involving improvement in performance, etc., are classed as Number II. Such changes are made by order of the Modification Board described below, and become effective only at such time as not to interfere unduly with production.
>
> "Improvements and additions, not vital but often valuable, are classed as Number III. They are made when convenient, both to Government and to contractor, and are not allowed to interfere with production or greatly increase price."

A Modification Board shall pass on changes and classify them. This board consists of five members, one from the Technical Division, one from Production, one from Operations, one from Finance and one from Supply. In the case of Number I changes, the director merely reports that such and such changes have been ordered. All other changes are ordered by the Modification Board at regular meetings.

Your mission is of the opinion that the establishment of some such uniform practice, covering not only such changes but also the method of paying for them, is essential to production, and should be a responsibility of the Technical Division.

RECOMMENDATIONS

(a) That all technical functions of the Government in respect to aeronautics be centralized in a single Technical Division which shall perform the work for the Army, Navy and civil aviation, and which shall be headed by preferably a civilian of wide executive experience. Such a division should include as assistants to the director, experienced representatives of Army, Navy and other Government departments interested in aviation, who shall be nominated by the departments and shall act as advisors upon the special needs of the service they represent.

(b) That steps be taken forthwith to secure for the United States the most advanced equipment for research, experimental and development work, and for the testing of motors, planes, balloons, etc., for the testing of materials; for the examination and testing of aeronautical appliances, including armament and instruments, and that such an organization shall be established as shall assure at all times that the research, experimental and development activities of the Government shall be second to none.

(c) That the research, experimental and development facilities and equipment now used in aviation by the Army, Navy and other Government departments be inventoried immediately and put, as far as practicable, under the control of the Technical Division, retaining such of same as may seem suitable and bringing them under a central control to make a complete and efficient equipment, and discarding such of them as unnecessarily duplicate others or are out of date. In making this change, great care should be exercised to guard against measures which might tend to interfere with suggestions for improvements and advances in aviation, material and methods, coming from the operating aviation branches of the Army, Navy and Postal Departments. Experience has proved that the initiative in the advance of motors, planes and accessories often comes from practical experience in the flying field, rather than from the scientific department of aeronautics. The Technical Division will, in co-operation with the operating forces, study, work out and apply all such suggestions. Care should be taken also to avoid duplicating facilities already in existence, such as water tanks, armament testing grounds and many other items operated by existing departments. Arrangements should be made whereby the existing plants of this sort can be used, on a proper payment basis, by the Technical Division.

(d) That extreme care be taken in such a process of adjustment to provide ample means whereby the special technical needs of the (a) Army, (b) Navy, and (c) civilian flying shall receive attention. Means should also be provided whereby military and naval experiments of a secret nature can be carried forward.

(e) That the organization of the Technical Division

cover by means of adequate personnel and equipment all branches of aeronautical research, experiment and development, including the application and aerial use of instruments, armaments and munitions, wireless telephone and telegraph, bombs and fittings, sights, fire fighting apparatus, parachutes, air bags and other safety devices, motor appliances for air service, propellers and photography.

(f) That all the technical facilities of the Technical Division for aviation, whether now existent or to be created, shall be available to private inventors and designers, upon proper and reasonable terms.

(g) That in view of the experience of England and France, it is dangerous to allow the Technical Division to operate under normal or war conditions a department of complete design in heavier-than-air machines or in motors, as such competition results immediately in stopping private departments of design. The Technical Division, therefore, should be a critic of and supplementary to private design, rather than aim at design on its own account. The policy of the Technical Division should be to maintain and encourage a considerable number of well-manned and well-equipped private design plants and to co-operate with these plants in all undertakings that meet with the approval of the Technical Division, and to place orders with these plants, at fair prices, for design and for experimental construction of motors, planes and appliances. Competition of the Government with the industry should be avoided, the only allowable exception being cases where, either on account of expense or for other cause, the Technical Division cannot obtain needed material or design from existing sources.

(h) That careful thought shall be given to the establishment of competition in motor, plane, balloons and accessory design, and encouragement be offered in every reasonable way to the promotion of competitive events and the establishment of standard records.

(i) That the Technical Division shall publish regularly and under competent management all the technical facts and data developed by the Division that may be helpful to the industry, reserving at the same time to itself the right to preserve secrecy in all matters that are deemed to be in the nature of naval or military secrets.

(j) That such a Technical Division shall maintain at all times as close touch as possible with the development abroad and shall maintain representatives in Europe charged with the duty of liaison between the American and European technical organizations.

(k) That a definite method of payment for independent design, experimental production, changes in design, alterations and adjustments be worked out by the Government as quickly as possible, to the end that the design and improvement of motors, planes, balloons and appliances may be stimulated and not stifled.

(l) That the Technical Division shall include an Inspection and Testing Department, which shall carry on all inspections and tests of experimental construction and revision, and which shall issue certificates of air-worthiness for all machines for private and commercial use, and shall, from time to time, inspect all machines and appliances, including landing fields, signals, etc., used by the public. In co-operation with the Civilian Division, this department shall have power to limit and control all types of air machines used in commerce, and to test such machines before they become production models. This department should have power to examine the inspection methods of all private concerns building aircraft, and to pass upon the quality of such methods from time to time.

(m) That close co-operation be maintained at all times with the purely technical aeronautical bodies, and also with the industrial bodies engaged in aeronautics, so that standardization of materials and practices may be carried forward as rapidly as can be done without hindering the development of the art or entailing undue losses upon the trade.

Respectfully submitted:

(Signed) BENEDICT CROWELL,
The Assistant Secretary of War.
(Signed) HOWARD C. COFFIN,
Member of Council of National Defense.
(Signed) HENRY C. MUSTIN.*
Captain, U. S. Navy.
(Signed) HALSEY DUNWOODY,
Colonel, Air Service, U. S. A., Assistant Chief, Air Service, A. E. F.
(Signed) JAMES A. BLAIR, JR.,
Lieut. Col., General Staff, U. S. A.
(Signed) GEORGE H. HOUSTON,
Pres., Wright-Martin Aeroplane Corporation.
(Signed) C. M. KEYS,
Pres., Curtiss Aeroplane & Motor Corporation.
(Signed) Y. S. S. BRADLEY,
Manager, Manufacturers' Aircraft Association.

*Note—*Subject to memoranda* 1 *and* 2, *July* 19, 1919.

AMERICAN AVIATION MISSION

R. M. S. "Aquitania,"
July 19, 1919.

Memorandum No. 1.

SUBJECT: Report of the Organization Committee, Aviation Mission.

1. I concur with the report of the Organization Committee of the American Aviation Mission, to which I have affixed my signature, with the following reservations:

(a) Provided that the personnel employed in Naval Aviation operations shall be composed exclusively of officers and enlisted men of the Navy, Marine Corps, Naval Aviation Reserve, and, where required for shore establishments, of civilians under the employ of the Navy.

(b) Provided that all advanced training of Naval Aviation personnel, excepting advanced aviation engineering courses, shall be under the direct control and supervision of the Navy.

(c) Provided that when officers and enlisted men of the Navy, Marine Corps or Naval Aviation Reserve are detailed for duty with the proposed Air Department, they shall retain their naval or Marine Corps ranks and ratings.

(d) Provided that administration and operation of all Naval Aviation forces shall be under the direct control of the Navy.

(e) It is recommended that the question of including in the proposed Air Department an offensive Air Force independent of the Army and Navy be left open, pending further investigation of this subject; and that the subject be investigated without delay by the Mission in conference with Army and Navy representatives who have made a special study of military and naval strategy.

(Signed) HENRY C. MUSTIN,
Captain, U. S. N.

Memorandum No. 2.

SUBJECT: Report of the Development Committee, American Aviation Mission.

1. I concur with the report of the Development Committee, to which I have affixed my signature, with the following reservations:

(f) Provided that nothing in the organization of the proposed Air Department shall restrict the Navy in the following activities:

(a) Maintenance of an organization adequate for the preparation of general specifications, general plans and characteristics of the aviation mechanisms, accessories and equipment required for Naval purposes.

(b) Maintenance of an organization and facilities adequate for carrying on experimental aviation work of a class that is exclusively of a Naval character, and that does not involve duplication of efforts and facilities in the proposed Air Department that are common to other aviation branches.

(c) Maintenance of an organization and facilities for conducting the acceptance and tactical tests of complete aviation mechanisms and accessories.

(Signed) HENRY C. MUSTIN,
Captain, U. S. N.

Import Duties on American Automotive Products

ALL the world needs cars, trucks, motorcycles, tires and parts, and the United States is, as has been the case for five years, the sole source of supply. Despite this condition, the bars of restrictive tariffs are raised against us, although the fence may be merely a temporary one.

As yet many countries have no specific duties for farm tractors or airplanes and special rulings are necessary for entry in some instances, while in others they are classed as motor vehicles.

AUTOMOTIVE INDUSTRIES has compiled the import duties of foreign countries in collaboration with the Division of Foreign Tariffs, Department of Commerce. These figures arranged in summary and detailed form to include practically all automotive products are presented herewith.

New tariffs have been adopted since the pre-war days in Australia, Chile, Ecuador, France, Algiers, Nicaragua, Mexico, Paraguay, Salvador, Turkey, the United Kingdom and its colonies, and Venezuela. The Central European Powers' tariffs are, o fcourse, constantly changing.

In some instances the rate of exchange will be found as important to prices as the duty. The British pound sterling, for example, which has depreciated to $4.31, reduces the price received by American makers or forces them to increase their selling prices, thus in itself acts similarly to a tariff.

Following are the foreign import duties on automotive products:

Rates of duty followed by per cent mark (%) are ad valorem rates

Countries	Motor Cars	Motor Trucks	Motorcycles	Tires	Parts
Abyssinia	10%.	10%.	10%.	10%.	10%.
Argentina (See Footnote 1)	32%	32%.	$30.88 each.	$28.02 per 100 lb., including surtax.	$15 41 per 100 lb. for engine parts. $8.40 for car parts including chassis.
Australia	$119.23 each for double-seated open body. $82.73 each, single-seated bodies. $204.39, canopy tops, e.g. limousine, taxicab, etc., plus 10% of value of chassis.	10% for chassis alone.	$58.40 each or 30%.	35%, or $0.49 per lb.	45%.
Austria-Hungary	$11.05 per 100 lb.	$9.20 per 100 lb.	$13.81 per 100 lb.	$13.81 per 100 lb.	$13.81 per 100 lb.
Belgium	$7.00 per 100 lb.	$5.25 per 100 lb.	$10.51 per 100 lb.	$10.16 per 100 lb. on net weight.	13%.
Bolivia	0.6%. Dutiable on appraised value.	0.6%.	40.25%, including surtax.	0.6%.	
Brazil	15.78%.	12.51%.	$23.54 each, including surtax.	12.51%, including surtax.	12.51%.
Bulgaria	$57.90 lb. each, including additional taxes.	$57.90 each.	$15.76 per 100 lb., net weight is basis.	$5.25 per 100 lb. on net weight.	
Canada	42.5%.	42.5%.	42.5%.	42.5%.	37.5-42.5%.
Chile	$9.93 per 100 lb.	$3.31 per 100 lb.	$24.83 per 100 lb. on net weight.	$9.93 per 100 lb. on net weight.	$9.93 per 100 lb.
Colombia	$0.49 per 100 lb., including surtax.	$0.49 per 100 lb., including surtax.	$2.43 per 100 lb., including surtaxes gross weight is basis.	$0.97 per 100 lb., including surtax.	$0.97 per 100 lb.
Costa Rica	$4.22 per 100 lb.	$1.27 per 100 lb. Surtax of 2% on cars and trucks.	$4.22 per 100 lb. on gross weight.	$4.22 per 100 lb.	$4.22 per 100 lb.
Cuba	25%.	25%.	25%.	25%.	25%.
Denmark	$1.22 per 100 lb.	$1.22 per 100 lb.	$7.29 per 100 lb. on net weight.	$6.08 per 100 lb. on net weight.	$1.22 per 100 lb.
Dominican Republic	20%.	20%.	25%.	$36.29 per 100 lb. on net weight.	20%.
Egypt (See Footnote 2)	8%.	8%.	8%.	8%.	8%.
Finland	10%.	10%.	$11.93 each, including navigation tax.	$18.00 per 100 lb., including navigation tax.	10%
France	70%.	70% (up to 5511 lb. in weight). Over 5511 lb. at rate of $12.55 per 220 lb	$60.73 per 220 lb.	Pneumatic, $22.19 per 100 lb., solid $14.79 per 100 lb.	At pre-war rates muitiplied by coefficients ranging from 1.1 to 3 and determined by the class of article.
Greece	$3.76 per 100 lb. weighing more than 1323 lb.	$1.03 per 100 lb., but not more than $53.08 each.	$8.69 each.	$1.03 per 100 lb. on net weight.	Chassis and motors, $0.55 per 100 lb., bodies for passenger cars, $77.70 each.
Germany	$2.70 per 100 lb.	$1.62 per 100 lb.	$8.10 per 100 lb. on net weight.	$6.48 per 100 lb. on net weight.	
Guam	Free.	Free.	Free.	Free.	Free.
Guatemala	$4.66 per 100 lb.	$4.66 per 100 lb.	$7.00 per 100 lb. on gross weight.	$7.00 per 100 lb. on net weight	
Guadeloupe	$19.30 each, less than four-passenger. $38.60 each, four-passenger or more.	$19.30 each.	4%.	6%.	4%.
Haiti	$11.16 each, including surtax. $27.90 for landaus, victorias, etc.	$5.58 each, including surtax, not including weighing fees, wharfage dues and consular visé.	$2.23 each, including surtax.	22.3%.	22.3%.
Hawaii	Free.	Free.	Free.	Free.	Free.
Honduras	Free.	Free.	Free.	Free.	Free.
India, British	7.5%.	7.5%.	7.5%.	7.5%.	7.5%.
Italy	$77.20 each, weighing from 1102 to 2205 lb.	$1.23 per 100 lb.	$15.44 each.	$5.25 per 100 lb. on net weight.	$0.96 per 100 lb.
Japan (including Formosa)	35%.	35%.	$46.61 each.	25%.	25%.
Mexico	Free.	Free.	$45.18 per 100 lb.	$16.94 per 100 lb.	$16.94 per 100 lb.
Morocco	12.5%.	12.5%.	12.5%.	12 5%.	12.5%.
Netherlands	5%.	5%.	5%.	5%.	5%.
Netherlands, Colonies of	10%.	10%.	10%.	10%.	10%.

Netherlands	5%.	5%.	5%.	5%.	5%.
Netherlands, Colonies of	10%.	10%.	10%.	10%.	10%.
Newfoundland	49.5%, including surtax.	49.5%, including surtax.	49.5%, including surtax.	49.5%, including surtax.	49.5%, including surtax.
New Zealand	20%.	20%.	20%.	Free.	20%.
Nicaragua	5.625%.	5.625%.	5.625%.	$30.62 per 100 lb. on net weight.	5.625%.
Norway (See Footnote 3)	12%.	12%.	$8.04 each, engine dutiable separately at 10%.	$3.65 per 100 lb. on net weight.	10%
Panama	15%.	15%.	15%.	15%.	15%.
Paraguay	42%.	42%.	$41.98 each.	$38.08 per 100 lb.	
Persia	10%.	10%.	10%.	10%.	10%.
Peru	11%, including surtax; automobiles de luxe, 22%.	Free.	33%.	$24.28 per 100 lb.	$4.86 per 100 lb.
Philippine Islands	Free.	Free.	Free.	Free.	Free.
Porto Rico	Free.	Free.	Free.	Free.	Free.
Portugal (See Footnote 5)	$98.00 each, two-passenger. $110.58 each, four-passenger or more.	$78.40 each, including surtax.	$14.70 each and luxury tax.	$2.08 per 100 lb.	
Portuguese Colonies	$35.25 each, except Mozambique.	$9.87 each.			
Mozambique	5%.	5%.	5%.	5%.	5%.
Roumania (See Footnote 6)	$4.46 per 100 lb., weighing 1102 to 2200 lb.	$3.06 per 100 lb. gross weight dutiable.	$7.44 per 100 lb. on gross weight.	$9.06 per 100 lb. on weight with immediate packing.	$8.75 per 100 lb.
Salvador	$2.29 per 100 lb., including surtax.	$2.29 per 100 lb.	$2.29 per 100 lb., including surtax.	$13.81 per 100 lb., including surtax on gross weight.	$2.29 per 100 lb.
Servia	12%.	10%.	12%.	$10.51 per 100 lb. on net weight.	10% for truck parts; 12%, car and motorcycle parts. Chassis weighing not over 1000 kilos, $7.00 per 100 lb. Over 1000 kilos, $8.75 per 100 lb.
Siam	3%.	3%.	3%.	3%.	3%.
Spain	$38.60 each, open. $61.76 each, closed. In addition to duty on chassis.	$3.50 per 100 lb.	$26.26 per 100 lb.	$23.64 per 100 lb. on net weight.	
Sweden	15%.	15%.	$16.68 each.	$14.59 per 100 lb. on net weight.	10% to 20%.
Switzerland	$3.06 per 100 lb.	$3.06 per 100 lb. gross weight is basis	$3.50 per 100 lb.	$0.70 per 100 lb. on gross weight.	
Turkey	$13.50 per 100 lb.	$5.00 per 100 lb. net weight dutiable.	$24.00 per 100 lb.	$15.00 per 100 lb. on net weight.	
Tutuila	10%.	10%.	10%.	10%.	10%.
Union of South Africa	20%.	3%.	20%.	20%.	20%.
United Kingdom	33.3%. (See Footnote 4.)	33.3%, including freight and insurance for dutiable value, but deducting tire value.	33.3%.	Free	33.3%.
United Kingdom, Colonies of:					
Aden	Free.	Free.	Free.	Free.	Free.
Antigua	13.3%.	13.3%.	13.3%.	13.3%.	13.3%.
Bahamas	11%.	11%, including surtax.	55%.	22%.	22%.
Barbados	11.25%.	11.25%.	11.25%.	11.25%.	10%.
Bermuda	Motor cars prohibited.		$1.34 each.		
British Guiana	16.5%.	16.5%.	16.5%.	16.5%.	16.5%.
British Honduras	15%.	15%.	15%.	15%.	15%.
British N. Borneo	10%.	10%.	10%.	10%.	10%.
Ceylon	7.5%.	7.5%.	7.5%.	7.5%.	7.5%.
Cyprus	Free.	Free.	10%.	Free.	Free.
Dominica	12.5%.	12.5%.	12.5%.	12.5%.	12.5%.
Federated Malay States	10%.	10%.	10%.	10%.	10%.
Gibraltar	Free.	Free.	Free.	Free.	Free.
Grenada	10%.	10%.	10%.	10%.	10%.
Hongkong	Free.	Free.	Free.	Free.	Free.
Jamaica	20%.	20%.	20%.	2 0%.	20%.
Malta	5%.	5%.	5%.	5%.	5%.
Mauritius	12%.	12%.	12%.	12%.	12%.
Montserrat	13.3%.	13.3%.	13.3%.	13.3%.	13.3%.
Nigeria	Free.	Free.	Free.	Free.	Free.
St. Christopher Nevis	11%.	11%.	11%.	11%.	11%.
St. Lucia	16.5%.	16.5%.	16.5%.	16.5%.	16.5%.
St. Vincent	17.2%.	17.2%.	17.2%.	17.2%.	17.2%.
Trinidad and Tobago	10%.	10%.	10%.	0%.	10%.
Sarawak	Free.	Free.	Free.	Free.	Free.
Straits Settlements	Free.	Free.	Free.	Free.	Free.
Turks and Caicos Islands	Free.	Free.	Free.	Free.	Free.
Zanzibar	7.5%.	7.5%.	7.5%.	7.5%.	7.5%.
Uruguay	19%, including surtaxes.	19%.	45%.	45%.	45%.
Venezuela	$0.69 per 100 lb., including surtaxes.	$0.69 per 100 lb.	$3.43 per 100 lb., including surtax.	$10.28 per 100 lb., including surtaxes.	$10.28 per 100 lb.
Virgin Islands of the U. S.	All articles of U. S. origin imported direct from this country are exempt from duty.	Free.	Free.	Free.	Free.

Footnote 1.—Dutiable on appraised value. Where cars are imported knocked down, the parts being packed in separate cases, the contents of each packing case must be stated in detail and weight given, as only such articles as form an integral part of a car imported knocked down will be admitted under tariff No. 362. Other parts are subject to the appropriate specific duty.

Footnote 2.—Imports at Alexandria are subject to wharfage and paving taxes amounting to one-half of 1 per cent ad valorem in addition to the customs duty shown above. At other ports different rates of taxes are imposed.

Footnote 3.—Passenger vehicles with seats for more than four, and motor trucks suitable for military use, may be admitted by the Customs Department under prescribed conditions at 5% ad valorem.

Footnote 4.—The value for duty purposes includes the cost of freight and insurance, but the value of the tires is to be deducted.

Footnote 5.—In addition to the regular import duties in Portugal there is a luxury surtax of 100 escudos ($70) on each complete automobile except for merchandise, and of 30 escudos ($21) on each motorcycle.

Footnote 6.—There is a special surtax of 2 per cent ad valorem on all goods imported in Roumania.

How to Make Your Business a Human Story for Employees

Recently a manufacturer discovered that his employees did not understand his business. Some of them thought that overhead was an item put into the statements merely to cover huge profits. This man was puzzled as to how to correct the misinformation. Mr. Tipper, in this article, tells how one company made an entirely human story out of business, putting all of the transactions on the stage so that all could see, step by step, just why a big business machine was needed.

By Harry Tipper

THERE is a great need at the present time for the public correction of the misinformation which is being dealt out through the general press in respect of certain facts and conditions regarding industry. Business men have written far too little and have talked too little before the public. They have not considered it necessary to justify business in the eyes of the public.

The general public do not read serious and thoughtful publications to any great extent. The circulation of this kind of media indicates the restricted number of thinkers of that kind. They read publications of news and of entertainment and the newspapers unquestionably exercise the most profound influence and are the most generally read by the large majority of the voters.

Newspapers are not concerned with analysis. They do not have the time or the opportunity to determine the rights of the case and all the factors that enter into it. They are continually under the pressing necessity of providing matter which will appear new and which will be interesting to the hasty reader.

As a result of this tendency and the utter lack of economic education in the schools, the majority of the people are without any correct information concerning industrial organization and they are entirely misinformed as to the function of capital, the profits of the manufacturer, the necessities of distribution, the place of the dealer and the whole requirement of the industrial machine in respect of which their opinion exercises considerable influence, both in labor and in politics, and in respect of which they may be called upon to judge, by their votes, as to the character of the future action.

Some manufacturers who have seen the danger of this situation have begun educational work in their own organizations with the idea of correcting these false impressions and opinions, at least among their own employees.

There are many examples of the kind, one of the most intelligent being the work done by the American Multigraph Co., who have adopted the constitutional plan of organization. These people evidently recognize the fact that in order to have such a plan successful, it was necessary that some common basis of understanding should be established in regard to industrial organization and that it was the duty of the company to inform its workers fully as to the character of the organization in which they were working, its application, its dependence upon the good will of its customers, its financial requirements and the reason for the existence of the various departments.

About two years were spent on this work, after an investigation into the belief and opinions of the workers and their knowledge or lack of knowledge in respect of this subject.

It was found that the workers were entirely ignorant of the function of capital. They knew little or nothing about stock and what it meant. They had no understanding of credit and they had no knowledge of the reasons for the specialized organization and its departments.

This is not surprising, of course, and to any one who has delved into the subject and talked with the worker it is to be expected. In fact, an examination of the newspapers which are read most widely by the workers will show the extent of the misinformation which they are receiving daily, the character of the propaganda, deliberate or ignorant, to which they are subjected and the constant endeavor on the part of many of such newspapers to excite the passions, the suspicions, and the cupidity of the worker rather than to inform him.

A careful study of all forms of entertainment, of reading, which comprise the daily recreation of a large majority of the working population in this country will show hardly a gleam of light in this direction. There is no source from which they can secure the knowledge which they must acquire if we are to have industrial co-operation except from the manufacturer, and it is clearly up to the manufacturer to attack the problem and settle it in such a way that he may be assured of a just demand from the worker.

It is evident from the program carried out in the American Multigraph organization that the necessity for this work was thoroughly understood. Two years were spent in this educational work preceding the submission of the constitutional plan to the workers.

Some of the subjects taken up were overhead, insurance, interest, shares, stocks, bonds, credit, estimating, good will and other items entering into the industrial organization.

Written and oral examinations were given in these

subjects, and the education is continuing, as the heads of the company are convinced that the necessities of business organization are not yet understood by the workers and they are fully convinced that it is the part of wisdom to acquaint the workers with all the facts in such a manner that they can be understood.

In these articles we have dwelt upon the necessity for promotion work and the necessity for a basis of understanding if the constitutional plan, the joint council plan and other organization developments are to be of value to the industry in the present and future necessities. This two years' work was a part of the promotion to develop the constitutional plan of organization within the establishment and everything was done with the object of providing a common ground of understanding as to the purposes and necessities of business organization so that the plan would have a full opportunity to work out to its utmost value when it was finally adopted.

The methods which were used in order to visualize these organization developments properly to the employees were the most interesting part of the program.

It was found that the employees did not know why many departments, not directly connected with production, were maintained and of what use they were. In order to show them something of the reasons for and necessity of these departments, a complete transaction was carried on in the meetings of the employees from the receipt of an order to the final signing of the bill. This transaction was staged on the meeting hall platform just as a play is staged in a theater.

* * *

A salesman came in with the order, distributed the copies to the men who would receive it by mail, ordinarily, at the main office. These men, on the stage, made out their records and their requisitions and passed the requisitions to the other departments represented there. These departments filled out their records, made their requisitions or orders and transferred them to the stores, to the shops and to the other branches necessary for the actual manufacture.

The visualizing of the manufacture was simple because most of the employees were engaged in that branch. Completed manufacturing job slips were returned to the proper departments, the necessary records and transfers made, the shipping orders placed, the bookkeeping records entered and the bill made.

It was desired to give the employees an idea of the reasons for the development of an organization from a small business, employing some general employees, to a large business with specialized departments, and in order to do this properly the first machine built was brought into the meeting, the inventor of the machine told employees how he worked on the invention, of the years which he spent in developing it, the difficulties which he had in finding the money to build it and the way in which he obtained the first $1,000 or so necessary to promote it.

Then the man who supplied the first money told of the sale of the first machines and the sale of the first stock, in order to get enough money to continue the business. Old employees, who had been in the company from the beginning, told how they had worked, perhaps as a tool maker in the morning and as a painter in the afternoon, showing that in those days of small endeavor the character of the job had to change with the necessities of the moment, and from that time on the story was picked up in successive talks until the reason for each step in advancement had been thoroughly visualized for the employees.

As an indication that this method of education was successful, the factory house organ is printing a series of articles by employees. These papers were written by the employees to show their understanding of the presentation and were called "examination papers." We quote one of these papers, reviewing President Osborn's talk on organization. The language and construction of the paper are both interesting. It follows:

BILL JONES' IDEA

I MET Bill Jones yesterday. Bill's a queer guy, one of these fellows with "Ideas." He always has some new thing on his mind. What do you think it is this time?

Well, you know Bill is always writing down these queer things that get into his head. Of course, he has always used pen and ink for that purpose, but he says he don't like that very well. It is so hard to rub out when he wants to make any changes in his writing. He's been trying to find something that will take the place of pen and ink and that will be easy to erase. Now, how's that for an idea? I think Bill's getting crazier every day.

What do you think he is going to do that writing with? You'd never guess in a year. Well, he had the handle of an old pewter spoon, and had whittled it down to a point and was using that. And say, it's funny, isn't it, but the darned thing worked all right. And Bill is as proud as an old hen with one chicken.

Hello, Charlie, I saw Bill again yesterday. You know, I told you about his using the spoon handle to write with. Well, he didn't like that so well after he had used it awhile. The pewter was too hard and didn't make a very clear mark. He has a piece of a bar of lead, whittled down to about the size of a slate pencil. He likes that better he says. It does make a clearer mark. I wonder what he will be thinking about next time I see him.

Say, Charlie, I saw Bill Jones Saturday. Bill is surely full of ideas. He didn't exactly like that piece of lead. It blackens his fingers till he looks like a charcoal burner. He says he is going to fix up a wooden case to fit it. That will make it better in two ways. He won't need as large a piece of lead and he can keep his fingers clean. Say, Charlie, I wonder if Bill is as crazy as we think he is?

Well, Charlie, this is a funny world. You know, I was telling you about Bill Jones last summer, and we thought we had the laugh on Bill about his crazy notions. Say, Charlie, Bill's built a shop on the back end of his lot and is actually making those writing things and selling them, too, as fast as he can make them. He says all the trouble is he can't make enough of them. His shop is too small and he is so busy he can't get out to sell them. He thinks if he had a bigger shop he could hire a few men to help him and make them by the bushel instead of by the dozen. Then if he could have somebody to get the material on hand, and someone who had nothing to do but sell the stuff, he could soon be selling them by the wagon load. How's that for a dream?

Of course you can see from Bill's talk that he is where he needs more money, if he takes care of all the business that is coming his way.

There, now! Don't laugh. Bill has asked me to go in with him and I have agreed to do so, and we are now getting ready to enlarge his shop. I've a sneaking notion that this writing thing will be a money-maker before long.

Well, we have the shop finished and all in working order. Bill is superintendent, manager and purchasing agent, all in one, and I am secretary and treasurer. We have employed six more men to work in the shop, and have put a salesman on the road to sell the stuff. We've been going on this plan for about three months, and you would be surprised if you knew how the business is growing. That salesman is sending in orders

faster than we can fill them. We've got to enlarge again or take him off the road. Don't you want to get in on this, Charlie? We can get the money for improvement, all right, but we want a good man along with the money, if we can get him, and I think you are just the man we need. There is too much work for Bill in his end of the business, and I know you could take the purchasing end and handle it in good shape. That will leave Bill with nothing to look after but the shop, and he knows the shop end of it from top to bottom. And say, Charlie, I wish we had two or three more good men to go in with us on this thing—practical fellows—men who know how to do things and can get along with men, we can use men like that right now to good advantage. How about your friends, John Kelly and George Smith? They are the right kind. I wish you would get them together and talk the matter over with them and let me know by Saturday what they think about it.

All right, Jim, I'll do that.

Well, Charlie, what did Kelly and Smith think of our proposition?

They thought it all right, Jim, and will be pleased to take an interest with us, but they suggest that it would be a good idea to reorganize so that each one should know just what his legal rights and obligations are. What do you think of that idea, Jim?

I think that is all right, Charlie. And say, you tell them to come over Saturday at 1 p. m. and meet yourself, Bill and me and we will get a lawyer and have this business fixed up right.

And there is another plan that I want to see put in operation here. There's nothing like good help to make a business go along smoothly and progressively. So I want our help interested financially in our success—either on a profit-sharing basis or as stockholders. My preference is for the latter. What do you say, Charlie?

All right, Jim, I'm on.

Say, Charlie, when this little "Pencil Factory" gets going along these lines we will be making some "smoke," don't you think?

You bet we will, Jim. Well, I must be going. So long, Jim.

So long, Charlie, see you Saturday at 1 p. m.

Evidently this employee had visualized the situation and visualized it as a human story which contains all the elements of the beginning and first stages of growth in the business. We are printing this because we feel that there are many manufacturers who will be interested in seeing how thoroughly the workers in one organization, at least, have been able to understand the growth of the business and the reasons for its departmental development.

Women in British Wartime Industry

An English correspondent contributes the following:

THE calling into the service of men filled the factories of this country with women to an extent never before seen in Great Britain, and probably not to be seen again in our time. Patriotically the step was to the good. Industrially the result was fair, but economically it was not all that it might have been or that had been expected of it.

A recent Parliamentary return shows that 792,000 women (including girls) entered British industry after 1914. Of these 99,000 were absorbed in the transport services, 38,000 in agriculture, and 429,000 in commerce.

In July, 1914, there were 170,000 women, or 9 per cent, in the engineering trades (this term being purposely elastic to include industries that are not concerned with the normal branches or work of the engineer and machinist), and in July, 1918, the number was 594,000 and the rate had advanced to 25 per cent. Just now there is a big problem to find work for the 16 per cent of women workers which represents the abnormal staff. It has been decided that when women are retained they shall be paid the same rate as the men they replaced, or are still replacing, but with the passing of the new Act to restore to trade unions their pre-war privileges and to the status, guaranteed by the Government early in the war to induce them to accelerate and increase output, it is fairly certain that only a small portion of this 16 per cent of women workers will continue in industry.

Taking the country as a whole, and all the trades, the increase of women labor was not as large as might have been expected from the fact that millions of men were called up from industry. Thus in July, 1914, the Board of Trade returns show there were 2,178,000 women and 6,300,000 men in British industry, these figures not including domestic and hotel services, teaching, agriculture and similar callings which are not considered here to be industrial. In July, 1918, the figures for women rose to 2,970,000, the net increase being 792,000, of which 704,000 are considered to have replaced men directly.

So far as the engineering trades are concerned, women's work mainly ranked as semi-skilled, the bulk of it being concerned with repetition work and processes, the women, in effect, being more machine-minders than machinists in the technical sense of that term.

Enthusiasm continued with many of these new hands up to the close of the war, and many employers would wish to retain them on normal production, claiming that they were more docile, did more work in a given time and, in some classes of output, did better than men. These three qualities can be accounted for on such grounds as patriotic enthusiasm, novelty of the work and the comparatively large earnings it afforded them, and, in the case of close precision work, by reason of the marked deftness of touch peculiar to women. On this score it is noticeable that in the second half period of the war, quite a fair proportion of women did inspection work and other duties requiring nicety of touch and a working acquaintance with micrometer gauging, etc.

As the war period wore on, however, there was a falling off reported, and in several quarters complaints of slackness and indifferent work on the part of the women began to be rife.

As time-keepers, the wartime women do not compare favorably with men, because of physical disparity, and in the case of married women because of the distraction of little children. Nevertheless, the facts show an average of 7 per cent lost time for women against 3.4 per cent time lost by men. On such home transport work as the motor bus and electric tram services, the returns all round are unsatisfactory as to the women workers; the defects complained of being lost time, failing to report for work (*i.e.*, missing days), lost takings, neglect to collect fares or shortage in paying in, incivility and accidents to passengers. In tram workshops and for road-repairing. women were only employed as an emergency provision.

On shell turning and other more exacting work, reports indicate that cost of training women was heavy, one large firm estimating the extra cost at 30 per cent, owing to wasted materials. On the other hand the average woman's earnings being but two-thirds of a man's (in wartime) may be offset to cover this extra cost. Before the war the average of woman's earnings was 12s. 2d. ($3) weekly, but at the close of the war it was nearly 35s. ($7) a week.

The FORUM

Plywood for Automobile Bodies

By O. M. Baxter

AMONG the factors which may be considered in the use of plywood for automobile bodies and disk wheels are the strength of plywood and its susceptibility to bending and to surface finishing. The first two qualities, of course, vary greatly with the species and relative thickness of core and face plies. We have found also that the number of plies has a marked effect on the properties, particularly the resistance to splitting, as, for example, when a plywood panel is fastened with screws or bolts along the edges. In general, too, a panel of a given thickness with a large number of plies will retain its shape better when subjected to various humidities than will a panel with a small number of plies.

The core stock in three-ply wood is very generally made of low density species. In airplane construction, where maximum bending or column strength per unit weight are desired, the use of low density species in the core and in the face veneer is usually to be recommended. In automobile construction, however, the conditions of manufacture and service may render it desirable to alter this practice.

Plywood glued with water-resistant glues, similar to those described in "Technical Note F-4," may be steamed or boiled for several hours without causing separation of the plies. Such conditioning softens the wood sufficiently so that it may be bent around comparatively sharp curves. By holding the plywood along the edges and pressing the same between dies after it has been steamed it is possible to upset or elongate the wood fibers to some extent. In this way plywood may be bent over slight double curvature.

Plywood may also be glued over a form so that, upon the setting of the glue, it will assume the desired curvatures. For the latter purpose the so-called cold glues or casein glues should be used, while either casein or blood albumin glues may be used in the process in which the flat panels are first prepared and subsequently steam bent.

From the foregoing it is evident that the particular plywood construction to be used for automobiles will depend on the relative importance of a considerable number of factors.—O. M. BAXTER, Acting Director, Forest Products Laboratory, Madison. Wis.

Favors Two-Bearing Pinion Shaft

By W. R. Strickland

REFERRING to the subject of rear axle design, especially in regard to the use of a bearing on each side of the pinion, this has been an old subject with us. We have used this design for a great many years on our old models.

We do not believe it is possible to mount three bearings on one shaft and have them all take their fair proportion of the load. Where such construction is used, each bearing on each side of the pinion must be large enough to take the full load. If these dimensions are not large enough to fully carry the entire load, trouble ensues, and for this reason we much prefer the present standard methods of using one bearing behind the gear and another ample bearing at the front end.—W. R. STRICKLAND, Chief Engineer, Peerless Motor Car Co.

No Great Fluctuations

By Paxton Mendelssohn

FROM present indications there will be no great fluctuation in the steel market for the rest of 1919. We do not see how steel can go any lower than it has been or is now, but believe it is on a fairly stable basis so that no acute increase is warranted, but if an increase should come along, we believe it would be only minor and only to offset any advance that may have to be paid to the labor market.

This idea is checked up by the fact that many of the steel people are perfectly willing to contract for the rest of this year at to-day's price and our chief steel department has been able to negotiate such contracts at to-day's price, which bears out this fact.—PAXTON MENDELSSOHN, Purchasing Agent, Fisher Body Corp.

Steel Going Up

By F. H. Maisonville

IN reference to recent editorials regarding the uncertainty of the steel market, it is our observation that the price of steel shows a strong tendency to go upward, and it seems to be only a question of the steel industries securing enough business to keep their mills operating at somewhere near their normal capacity. When this time arrives, we will see an increase in the price of steel and steel products. From all indications there is a great deal of activity in the steel industry, and it would seem now that we will have higher prices before the end of the present year.—F. H. MAISONVILLE, Director of Purchases, Timken-Detroit Axle Co.

Steel Likely to Go Up

By Fred Haskel

IT is the writer's opinion that the price of steel is more likely to go up than to go down. We are buying only what we need and are trying to reduce our stock of raw material.—FRED HASKELL, Secretary and Manager, Detroit Stamping Co.

Supplementary Air Valve in New Place

A SUPPLEMENTARY air valve, which instead of being fitted to the inlet manifold is screwed into the cylinder wall at the bottom end of the stroke, is attracting attention. An advantage claimed for this arrangement is that the air admitted through this supplementary valve will remain at the bottom of the combustion chambers, thus causing a stratification of the charge, so that the additional air will not interfere with the inflammability of the charge when only a small amount is admitted, as when the engine is heavily throttled.

WORK has been commenced on the construction of an airdrome in India on the Agram Plain, near the old cavalry rifle butts, Bangalore.

AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

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Automotive Industries—The Automobile is a consolidation of The Automobile (monthly) and the Motor Review (weekly), May, 1902, Dealer and Repairman (monthly), October, 1903, and the Automobile Magazine (monthly), July, 1907, and The Horseless Age (semi-monthly) May, 1918.

Trade Marks in Mexico

NOW that there appears to be an excellent opening for automotive trade in Mexico, it is important that American manufacturers protect their trade marks in that country. There has been some pirating of trade marks in the country of revolutions, which shows that this dangerous practice is possible. It is true that the thefts have not reached the stage of some other Latin-American countries, but with a trade revival under way it is not to be supposed that there is a lack of men in Mexico who would be slow to grab the questionable profit involved in this practice.

The U. S. Bureau of Foreign and Domestic Commerce has taken notice of this danger to American business and has included in its publication, designated as Tariff Series No. 31, directions for protection of American trade marks in Mexico. It is not difficult to protect trade marks in that country, as well as other Latin-American countries, and it certainly is a duty that the manufacturer owes to the future of his business.

Cord Tires

NOW that we have found through the school of experience that the cord tire is so far superior to the fabric, why not adopt it more generally? The difference in cost seems to be little as compared with the gain in mileage, riding ability and even fuel economy. We were told by tire makers three years ago that the cord tire was far better structurally than the fabric. It has proven that cord tires give an increased mileage.

No doubt if the demand were increased, the production cost of these tires could be reduced despite the fact that they are made over size. It is necessarily going to be a matter of evolution in the tire factories, because the fabric tire machinery must be displaced by that used for manufacture of the cord tires; nevertheless, it will be a true conservation of rubber and material generally to have the cord tire more generally used. A good place to begin the education of the public in the use of these tires is for the manufacturer to equip his new cars with the best tires.

Living Cost

A RECENT statement by the Bradstreet Agency reported that the cost of living had reached the high point on Aug. 1. This statement was issued immediately after that date and, of course, contained no intimation as to the future or that a decline had begun.

About the same time there was begun, from many points, attacks on the high cost of living, for which great promises are made by the instigators. Some of these are taking the form of official investigations with a view of later criminal prosecutions; others are looking to the future in a more direct form with a view to curbing profits on all necessaries.

Regardless of the form taken by these attacks, they are of direct interest to manufacturers and all employers of labor. The best single agency to-day in quieting the unrest of labor would be to lower the cost of living or convince the person chiefly concerned in making both ends meet of a legitimate reason for the high cost. Employers can well lend their energy to aiding worthy lower cost of living movements.

Andrew Carnegie

ANDREW CARNEGIE'S business career was closing when the automotive vehicle became an important factor in the world's business. His great organizing genius was not a direct factor in automotive promotion. Had he lived a generation later the story probably would have been different. But he voluntarily closed his career just on the threshold of the automotive opportunity.

But indirectly the Scotch Ironmaster has been a very important factor. It was Carnegie who took the hit-and-miss iron business and created from it a science of steel. He led the way in the development of the industry that made the worth-while automotive vehicle possible.

Aeronautic Report Has Many Important Recommendations

THE report of the American Aviation Mission, published in full in this issue of AUTOMOTIVE INDUSTRIES, contains many suggestions that are sound and fundamental. The statements showing the rapid decline of the aeronautic industry in this country, the importance it holds in commerce and defense, the recognition of its value by France, Italy and England, and the demand that our Government should give aid to the manufacturers are unquestionable.

This country cannot be too prompt in its establishment of federal laws preventing legislation by individual states which would create confusion similar to that existing in the early days of the automobile. There must be comprehensive regulations to license and control pilots, establish landing fields, emergency stations, routes, signal and communication facilities.

The maintenance of a purely military air force of sufficient size would be an "extravagance" beyond the comprehension of Congress. Consequently, the establishment of a commercial aeronautic industry in addition to a moderate military organization offers the solution to the problem and means that our Government must assist aircraft manufacturers.

The suggestion of a single governmental agency to have complete control of aeronautics comes from experienced men. It follows a broad investigation and widens the discussion of this suggestion already offered by various officials and in bills now before Congress.

At the same time the continued opposition to the plan by Secretary Newton D. Baker, supported by the earlier similar views of Secretaries Daniels and Redfield and General Menoher, warrants cautious and deliberate action. There must be careful weighing of the pros and cons.

Why should all aeronautics be centered in a single body?

Why should it be scattered among a number of diversified bureaus?

Is aviation of sufficient importance to merit an executive with a seat in the presidential cabinet?

Will aviation be of such consequence in the near future that we must build to-day for to-morrow and have the department ready as the vehicle for aeronautical development when that time arrives?

These and many other questions enter into the problem and must be considered.

There must be no hasty passage of bills. There must be no speedy conclusion to disregard the recommendations. There must be no time wasted. We need a definite aeronautic policy that will be sound and progressive and we need it as promptly as it can be evolved.

The report displays a thorough understanding of the chief problems of the moment.

There are heavy expenses facing the airplane manufacturer who undertakes to manufacture planes of a new design for the Government, and he is justified in asking remuneration when he carries on the experimentation and development. The airplane business is not to be compared with the automobile industry. While an automobile manufacturer can easily spread his cost of design, experimentation and development over thousands of cars, the airplane maker must add his to the first planes so ordered. He may never sell another of the same type.

Similarly, the continuation of design by Government bureaus will mean a harmful competition between Government and industry instead of a healthy situation such as would result if the Government acted purely as a critic. The plan used in England, where makers have been supplied with data showing the performance desired in a plane and ordered to submit designs in accordance, has resulted in a broad development. It is a certainty that many designs from many makers must bring higher development than a few designs coming from one and the same designing room.

There is thanks due to the Mission for bringing these matters before the public and official Washington.

Analysis of Automotive Exports During 1918-1919

Cars, Trucks and Parts Show Increase in Total Value—Cars Drop in Number—A Redistribution of Trade

WASHINGTON, Aug. 11.—The following table shows gains and losses in our exports of passenger cars, trucks and parts for the fiscal year ending June 30, 1919, as against the figures for the year 1918:

	Cars		Trucks		Parts,
	No.	Value.	No.	Value	Value
1919	41,291	$45,852,705	12,905	$33,195,062	$37,218,783
1918	52,312	45,331,366	12,200	31,874,459	32,933,006
	—11,021	+$521,339	+705	+$1,320,603	+$4,285,777

Taking the total values of cars, trucks and parts, the followinf figures result:

1919.....$116,266,550
1918..... 110,138,777

A net increase of $6,127,719 in 1919, equal to 5.56 per cent, is thus shown.

In tracing the trend of trade, several changes which were not unexpected are shown in the following figures.

France has been our best customer each year, but the trade of both France and the United Kingdom has been abnormal, owing to war conditions. Moreover, it has been necessary to meet the demands of these countries, whereas shortage of passenger car production has adversely affected our trade with others, notably with Canada and Latin America. On the other hand, we are opening up business with Denmark and Norway, countries which were practically cut off during the war. The following totals are self-explanatory:

Exports to Canada

	Cars	Value	Trucks	Value
1919	6,131	$5,758,609	1,702	$2,449,288
1918	12,981	10,186,170	1,108	1,381,542
	—4,850	—$4,427,561	+594	+$1,067,746

Exports to United Kingdom

	Cars	Value	Trucks	Value
1919	837	$1,029,662	884	$2,566,235
1918	892	1,929,677	5,202	14,643,309
	—55	—$900,015	—4,318	—$12,067,074

Exports to France

	Cars	Value	Trucks	Value
1919	866	$1,629,332	4,286	$17,676,480
1918	1,169	1,518,858	2,754	10,001,626
	—303	+$110,474	+1,532	+$7,654,854

Exports to Denmark

	Cars	Value	Trucks	Value
1919	1,069	$1,305,992	....	.....
1918	2	4,100	....	.....
	+1,067	+$1,301,892	....	.....

Exports to Norway

	Cars	Value	Trucks	Value
1919	761	$1,187,692	....	.....
1918	97	115,810	....	.....
	+664	+$1,071,882	....	.....

Exports to Australia

	Cars	Value	Trucks	Value
1919	3,307	$3,200,280	....	.....
1918	4,307	3,410,557	....	.....
	—1,000	—$210,277	....	.....

Exports to New Zealand

	Cars	Value	Trucks	Value
1919	1,712	$1,798,767	....	.....
1918	1,682	1,342,720	....	.....
	+30	+$456,047	....	.....

Exports to Argentina

	Cars	Value	Trucks	Value
1919	1,634	$2,084,325	67	$131,817
1918	3,525	2,666,898	51	50,124
	—1,891	—$582,563	+16	+$81,693

Demand for Closed Cars Unusually High in Detroit

DETROIT, Aug. 9—There is an unusual demand here for closed cars. Dealers say the closed models are sought by nearly 40 per cent of July purchasers.

There is a shortage of closed cars here. Some dealers are unable to promise closed car deliveries before spring. Others have sold their entire year's allotment, while others have contracted for all they can get for the next four months. With colder weather due shortly the demand is steadily increasing. Production of closed cars averages one closed car to four open models. Labor controversies in the various automotive plants have caused a falling off in production and this has greatly aggravated conditions.

IRON INDUSTRY IN 1918

WASHINGTON, Aug. 10—A decrease in the output of iron ore and an increase in the value of the iron ore mined in 1918 is displayed in statistics on iron ore mining just made public by the United States Geological Survey, Department of the Interior.

The iron ore mined in the United States in 1918, exclusive of that containing 5 per cent or more of manganese, amounted to 69,658,278 gross tons, compared with 75,288,851 tons in 1917, a decrease of 7.5 per cent. The quantity of ore shipped from the mines in 1918 was 72 021,202 gross tons, valued at $244,368,147, compared with 75,573,207 tons valued at $238,260,444 in 1917, a decrease in quantity of 4.7 per cent, but an increase in value of 2.6 per cent.

The average selling value of the ore per gross ton at the mines for the whole United States in 1918 was $3.39, compared with $3.15 in 1917. The stocks of iron ore at the mines, mainly in Michigan and Minnesota, amounted at the close of 1918 to 8,471,507 gross tons, compared with 11,003,843 tons in 1917, a decrease of about 23 per cent.

MAY BUY DOBLE OUTRIGHT

DETROIT, Aug. 11—Further information concerning the agreement by which the Doble steam cars will be manufactured by the Amalgamated Machinery Corp. of Chicago were given out here to-day by the Doble-Detroit Steam Motors Co. The Chicago corporation is given the right to purchase outright the Doble company as a going concern. But no further stock of that company is to be placed on the market. It is capitalized at $10,000,000, of which $2,000,000 has been issued to the public. Denials were made that any of the remaining stock was purchased by the Amalgamated company.

NEW STEEL COMPANY

CLEVELAND, Aug. 10—The J C. Cromwell Steel Co. has been incorporated here for $4,000,000 and will take over the business of the Cromwell Steel Co. Lorain, Ohio.

Analysis of Automotive Exports

(*Continued from page* 336)

Exports to Chile

	Cars	Value	Trucks	Value
1919	1,057	$1,606,758	....	.....
1918	3,399	3,576,571	220	$282,638
	—2,342	—$1,969,813	—220	—$282,638

Exports to Cuba

	Cars	Value	Trucks	Value
1919	2,075	$2,727,216	680	$1,407,102
1918	2,961	3,029,813	554	1,130,892
	—886	—$302,597	+126	+$276,210

Exports to Mexico

	Cars	Value	Trucks	Value
1919	2,168	$1,960,613	....	.....
1918	2,578	1,653,545	365	$525,664
	—410	+$307,068	—365	—$525,664

Exports of Automotive Equipment for June and 12 Previous Months

	1918 No.	1918 Value	1919 No.	1919 Value	1918 No.	1918 Value	1919 No.	1919 Value
Airplanes	1	$3,500	4	$27,000	20	$206,120	51	$644,600
Airplane Parts	.....	1,609,503	....	967,345	.....	8,877,977	.....	12,216,801
Commercial Cars	829	2,001,488	1,755	3,908,484	12,200	31,874,459	12,905	33,195,062
Motorcycles	1,163	286,096	2,943	784,907	10,599	2,364,785	14,214	3,715,015
Passenger Cars	3,098	2,808,463	7,879	8,325,563	52,312	45,331,366	41,291	45,852,705
Parts, not including engines and tires	....	3,195,353	....	4,561,287	.....	32,933,006	.....	37,218,783

	1918 No.	1918 Value	1919 No.	1919 Value	1918 No.	1918 Value	1919 No.	1919 Value
Automobile, gas	2,374	$253,894	4,249	$699,263	35,837	$4,127,257	28,445	$4,434,244
Marine, gas	240	139,029	1,609	465,941	7,225	2,603,104	8,617	4,130,308
Stationary, gas	1,912	206,341	2,355	387,134	27,552	3,126,754	23,926	3,439,861
Tractor, gas	1,189	1,528,658	1,588	1,676,527	23,560	23,995,023	20,361	21,995,548
Total	5,715	$2,127,922	9,801	$3,228,865	94,174	$33,852,138	81,349	$33,999,961

Exports by Countries for June, 1919, and 12 Months Ending June, 1919

	Cars No.	Cars Value	Trucks No.	Trucks Value	Cars No.	Cars Value	Trucks No.	Trucks Value
Denmark	687	$735,559	....	.....	1,069	$1,305,992	.....	.....
France	108	404,407	442	$1,595,841	866	1,629,332	4,286	$17,676,480
Norway	332	388,692	....	.....	761	1,187,692	.....	.....
Russia in Europe	....	.....	....	.....	6	6,605	.....	.....
Spain	181	226,865	....	.....	946	1,161,368	.....	.....
United Kingdom	446	484,535	7	21,581	837	1,029,662	884	2,566,235
Canada	1,329	1,232,011	217	326,360	6,131	5,758,609	1,702	2,449,288
Mexico	217	159,880	....	.....	2,168	1,960,613	.....	.....
Cuba	188	179,331	70	215,016	2,075	2,727,216	680	1,407,102
Argentina	164	295,864	14	25,358	1,634	2,084,325	67	131,817
Chile	28	21,379	....	.....	1,957	1,606,758	.....	.....
Uruguay	284	194,378	....	.....	1,487	1,295,120	.....	.....
British India	367	407,537	....	.....	716	829,237	.....	.....
Dutch East Indies	236	311,196	....	.....	2,299	2,966,123	.....	.....
Russia in Asia	....	.....	....	.....	41	39,679	16	22,000
Australia	429	447,026	....	.....	3,307	3,200,280	.....	.....
New Zealand	224	250,478	....	.....	1,712	1,798,767	.....	.....
Philippine Islands	373	374,599	....	.....	1,974	2,099,230	.....	.....
Br. So. Africa	365	372,459	....	.....	1,526	1,728,584	.....	.....
Other countries	1,921	1,839,367	1,005	1,724,328	10,679	11,437,513	5,210	8,941,440
Total	7,379	$8,325,563	1,755	$3,908,484	41,291	$45,852,705	12,027	$33,311,309

The data given in relation to individual countries is interesting, so far as it goes. Figures covering those countries referred to in the main table as "others" will be amplified later on and may serve to cast a new light on the position.

However, present indications are that France's purchases of war trucks in 1919, less her purchases in 1918, are alone more than sufficient to account for our gain of 5.56 per cent, and this gain includes our increase on parts exports. In other words, our increased exports are due to abnormal conditions in a single country.

Turning to passenger cars, it is evident that diminished production rather than lack of shipping facilities is responsible for the big drop in our trade with Canada. This is, in a sense, proved by our exports to Cuba, as we have gained on trucks although losing on cars —fairly conclusive evidence that transport was available.

Latin America so far shows a disappointing result. Later figures, which should be available in two or three weeks, may put a better complexion on the position.

We are now facing the problems of 1920 automotive export trade, certain in the knowledge that our war-time orders are things of the past. We have as yet a monopoly on the markets of the world, we have greatly improved shipping facilities, we have no financial problems which are unsurmountable and our production is increasing day by day. Our position is unique, if we take full advantage of it.

Europe To See Many New Cars At London

Olympia Show Brings Large Entry List — American Models Few

LONDON, July 16 (*Special Correspondence*)—The allocations of the chief spaces for the Olympia Motor Show, Nov. 7 to 16, which were made to-day, are of especial interest in that they show which of the well known makers will exhibit their cars in the English market this fall. The first announcement of spaces includes only three American cars—Overland, General Motors Corp. and Cadillac—as having been allotted spaces. There are several spaces not yet assigned and it is considered probable that some other American cars will be represented.

British makers naturally take most of the space allotted. In the center of the floor are found the older and better known firms, such as Rolls-Royce, Napier, Daimler and Crossley. Then come Calthorpe, Wolseley, Austin, Siddeley-Deasy, Vauxhall, Sunbeam, Talbot, Humber, Rover, Hampton, Guy, Standard, Donne & Williams, Turner, Vulcan, Belsize, Hillman, Swift, Phoenix, Rawlence, Iris, Lanchester, Singer, Enfield-Allday, Straker-Squire, Seabrook, Sheffield Simplex, Star, Angus-Sanderson, F. W. Berwick, Grahame-White Hertford St. Motor Co., Jarrott & Letts, Jackson, and Newton & Bennett.

Several of these entrants are known in America chiefly as dealers and others have previously sold foreign built cars under their own names. In most cases, it is not yet revealed what their after-the-war plans are, but it is believed their requests for space are based on plans to produce a new light car, which are being announced so freely in this country.

Arrol Johnston is the only Scotch firm represented.

French manufacturers have taken much space. Their chief representatives are: Renault, Brasier, Darracq, Panhard, Peugeot, Delehaye, Delauny-Belleville, Gregoire, Delage, Chapron, La Buire, Unic, Gladiator, DeDion, Vinot, Lorraine-Dietrich, and Bayard.

Then there is the International selling firm, London & Paris.

Belgium is represented by the Minerva.

Italian manufacturers are better represented than perhaps many expected—the F.I.A.T., Lancia, Bianchi, and Isotta-Fraschini.

AIR MAIL TO STEAMER

NEW YORK, Aug. 12—Mail will be delivered by airplane to the liner Adriatic two hours after she sails on Thursday by the New York Post Office. This will be the first attempt to drop mail from a plane on the deck of a sailing steamer. The mail will be carried in a waterproof, non-sinkable rubber bag. If the experiment proves succesful it will probably become a regular feature.

Merger Plans Ready For Maxwell-Chalmers

Stock of Old Companies Exchanged for New—Increased Production and New Plants

DETROIT, Aug. 12—Plans for the merger of the Maxwell-Chalmers interests have been completed, there remaining but a few minor details to be adjusted before the plan is placed before the stockholders of both companies for their approval.

The plan contemplates an exchange of securities of the two companies for no par value stock in a new company which will be known as the Maxwell-Chalmers Motor Corp. The exchange will be made in the following proportions:

Maxwell first preferred 120 per cent; Maxwell second preferred 66½ per cent; Maxwell common 70 per cent; Chalmers preferred 95 per cent, and Chalmers common 15 per cent. An issue of $10,000,000 notes which are to be convertible into new stock is also included. The conversion price will be between 70 and 75. The $10,000,000 notes will be sold to furnish working capital.

Manufacturing plans call for a huge production increase of both Maxwell and Chalmers cars. The Maxwell company is at present running 200 cars daily, while Chalmers daily production is averaging 70 cars. The Maxwell company is 35,000 cars behind orders while Chalmers has 7000 orders ahead. The Maxwell branch hopes to manufacture 100,000 machines in 1920, and Chalmers production will be boosted to 40,000.

Work on the new Maxwell plant is progressing rapidly. As quickly as possible Maxwell production will be moved from the present Chalmers Motor Car Co. plant, where both cars are now being made. The government still owes the Maxwell company $10,000,000 for war work, which may be settled at any time. The new Maxwell manufacturing division will be in Highland Park. It will cover 75 acres and cost $12,000,000. It will employ 15,000 men.

The new factory being built here will take two years to complete. The completed plant will have 13 units and an 800 ft. loading dock. It will have a daily capacity of 500 cars.

The factory will include administration building, laboratory, machine shop, power house, assembly building, two storage buildings, axle and body plants, heat treat, motor assembly and pressed steel plants. The majority of the buildings will be one-story of concrete, brick and steel.

CARS WITH HAND-MADE BODIES

NEW YORK, Aug. 9—The Collins Motors, Inc., has been organized to build special cars to compete with foreign-made cars sold in this country. A 120-in. wheelbase chassis will carry a roadster body built for the clubman and amateur sportsman. A longer chassis will be fitted with touring, town and other special hand-made bodies. General offices and the factory will be at Huntington, L. I., while the metropolitan sales and export offices will be in New York.

The company is capitalized for $400,000 and has the following officers: President, Albert H. Collins; vice-president, William B. Brewster; treasurer, Spencer C. Smith; and secretary, Charles H. Stoll.

Enemy Cars Barred At Automobile Salon

NEW YORK, Aug. 12—German and Austrian exhibits have been barred from the Automobile Salon to be held this year at the Hotel Commodore. After denying the application of one German manufacturer for display space, the management announced that no entries would be permitted from enemy countries.

The salon will be held Nov. 16 to 23—horse show week—and will occupy the entire second floor of the Commodore. Already fourteen makes of cars, seven of them foreign, have been granted space and arrangements are being made for a sizeable exhibition of automotive equipment.

Slight Rise in Rubber Imports Shown for July

NEW YORK, Aug. 12—Crude rubber amounting to 17,965 tons was imported in July this year, which is an increase of 873 tons over July, 1918, and an increase of 1646 tons over June of this year. Although June imports dropped to 16,319 tons from 24,124 tons of last year, the 1918 figures were unusually high, the average import for June being nearer this year's figures. In spite of the relatively low rubber market prevailing at present, July figures show a satisfactory record, being higher than those of the same month for the past four years.

Official figures compiled by the Rubber Association of America give comparative figures for the past four years as follows:

	1919 Tons	1918 Tons	1917 Tons	1916 Tons
January	7,235	16,084	12,788	9,162
February	14,079	13,108	10,162	1,597
March	28,233	17,161	18,624	10,070
April	27,948	13,425	13,000	10,014
May	16,348	16,288	18,411	11,189
June	16,319	24,124	15,096	13,153
July	17,965	16,092	17,290	6,650

OLDS GETS POWER PLANT

LANSING, Aug. 12—The General Motors Corp. has made another appropriation with which to build a power plant for the Olds Motor Works. Approximately $250,000 will be spent on this plant. Work is now under way. The purpose of the power plant is primarily for fire protection.

Owen Magnetic Leaves Baker For New Plant

Divorced from Baker, Will Be Made at Wilkes-Barre, Pa.—Production Soon

NEW YORK, Aug. 13—Manufacture of the Owen Magnetic at the Cleveland plants of the Baker R. & L. Co. will be given up, according to announcement here to-day, and undertaken by the International Fabricating Co. at Wilkes-Barre, Pa. The details of the new arrangement were made public by R. M. Owen, of the Owen Magnetic Car Corp., designer and builder of the car. The announcement revealed that the Owen company had been entirely divorced from the Baker corporation and that its production in the future would be carried on independently from that of the electric cars of Baker.

The International plant has been engaged in the manufacture of precision machinery, principally making munitions during the war. This company, it was given out, virtually has succeeded to control of the Owen car and manufacture will be gotten under way at once. Advance plans, according to Owen, call for a production basis of at least 1000 cars annually, continuing practically the present line. While only one model will be made, several bodies will be supplied and a complete line offered.

W. M. Dennison is president of the fabricating company and has been engaged in varied manufacturing lines for some time. The financial strength was not given out except that it was large.

The change in ownership, the details of which have been in process for some months, will result in a wide-awake sales policy for the Owen, it was given out, with sales and service stations opened throughout the country.

Duesenberg Motor Goes to Rochester

NEW YORK, Aug. 14—Announcement was made here to-day by the Duesenberg Motors Corp. that the Rochester Motors Co., Inc., Rochester, N. Y., had acquired all manufacturing and selling rights of the Duesenberg designed and Duesenberg type automobile motors. Production already has been started on a four-cylinder Model G-3 engine, known as the Rochester-Duesenberg, as a development of the Model G engine produced by the Duesenberg company early in 1918, having a rating of approximately 75 hp.

Sale of Dorris Car Resumed in the East

NEW YORK, Aug. 12—After more than ten years' absence from the eastern field, the Dorris car again is to be marketed in New York, distribution and salesrooms having been opened by the Carlton Motors Corp. at Park Avenue and Fifty-third Street.

Air Probe Reveals Program Unfinished

Investigating Committee Hears Menoher and Foulois Discuss Alleged Faults

WASHINGTON, Aug. 11—The House Committee investigating aviation will make a month's inquiry in the Pacific Northwest of the charges made against John D. Ryan at its recent hearings here. The committee also will investigate the sale of surplus linen, contracts for the production of castor beans and other matters incident to the aviation program.

"Protests from responsible persons on the Pacific Coast and against the proposed sales," stated Chairman Frear of the committee, "have been placed before our committee. A remarkable situation developed when we discovered that the contract vouchers and data covering $50,000,000 spruce production expenditures were kept at Portland, Ore., and not filed here. The committee is called upon not only to find out what was done with the money spent for spruce production purposes, but also with money expended for the construction of logging roads, costing more than $100,000 per mile and useful for the Chicago, Milwaukee & St. Paul Railroad alone."

Investigations last week continued to deal with the reported burning of airplanes and with the expenditure of the $640,000,000 appropriated for the Air Service by Congress. The automobile industry was again blamed when Col. Edward Deeds, Col. Sidney D. Walden, and Howard E. Coffin were named as the members of the Aircraft Board who "overruled" the other members of the committee. Since the inquiry is based on the report filed by the Senate Committee last year, which also blamed the automobile industry, it was expected that similar denouncement would be made at this time.

The Original Program

The first aviation program in the war called for 22,625 planes, including 5000 JN-4 Curtiss planes, 2500 DeHaviland 4's, 800 S. E. 5's, 800 Spads, 800 Sopwiths, 200 R-4 Curtiss planes, 350 R-6 Curtiss planes, 175 Farman C's, 6667 fighting planes of a type to be determined, 4000 observation planes and 1333 bombing planes, type undecided but probably Caproni.

There would also be made 45,250 aircraft engines, including Rolls-Royce, Hispano-Suiza, Clergets and others. The actual estimates were submitted by Maj. B. D. Foulois, who later, as Brigadier General, commanded A. E. F. aviation. The total amounted to $639,241,452. Congress promptly appropriated $640,000,000.

"You obtained the $640,000,000 from Congress," inquired Chairman Frear, "to carry out a specific program. Was that program ever carried out?"

"It was not," was the prompt reply. "I was sent to France in October, 1917," continued Major Foulois. "At that time I left, as I supposed, officers here who were determined to see that the program was carried out. Apparently they were overruled by other members of the committee, for it was never carried out."

"Who were the other members of the committee?" inquired the chairman.

"As nearly as I can recollect, they were Colonel Deeds, Colonel Montgomery, Howard Coffin, and Colonel Walden," Foulois declared.

Chairman Frear elicited from the witness the fact that Colonel Deeds was especially interested in the Delco ignition system, which was made an essential part of the Liberty motor, that Colonel Montgomery was a Philadelphia banker who had had some experience in dealing in automobile securities, that Coffin was president or vice-president of the Hudson Motor Car Co. and Colonel Walden was an official of the Packard Motor Car Co.

Air Service Exceeded British

"Then the automobile interests overruled the military officers, did they not?" inquired the chairman.

"It would look so," replied the witness; adding, "So far as I know, none of these men had had experience with aviation or the construction of airplanes."

The United States, however, had as many airplanes on the French front at the signing of the armistice as the British had there when America entered the war, Major Foulois told the committee. In other words, America put as many planes on the front in the year and a half she was in the war as the British placed there in the two and a half years of the war prior to America's entry, he said.

If it hadn't been for the United States there "wouldn't have been any air service 'over there,'" was another statement Major Foulois made in response to a question by Representative Lea of California, minority member of the subcommittee, as to whether America's contribution to the Air Service had aided in winning the war.

Earlier in his statement, under direct questioning by Representative Frear, Major Foulois censured the War College for its failure to adopt the air service organization program. This, he said, he prepared shortly after America entered the war and it was included in the bill passd by Congress when it made the first important appropriation for aviation.

2716 Surplus Airplanes Sold

Army surplus airplanes to the number of 2716, valued at $20,815,800, were sold to the Curtiss Aeroplane & Motor Corp. for $2,720,000, according to the testimony of Maj. Gen. Charles T. Menoher, Director of the Army Air Service.

Licensed pilots cannot buy planes direct from the Army, General Menoher asserted, contradicting the recent statement of Secretary Baker.

The hearing developed that army planes are sold to the Curtiss company at $400 each and are resold at prices ranging from $2,000 to $3,500 each.

Attacks Air Policy

Correspondence between army officials and airplane buyers, made public in the hearing, stated that the surplus planes should be sold to the manufacturers in order to protect them. Chairman Frear attacked this admission, insisting that it was precisely analogous to the policy of the War Department in keeping food supplies from the market to "stabilize" prices, or, in other words, to maintain higher prices to consumers. General Menoher commended the policy of selling only to commercial companies, his position being that the War Department could not guarantee the safety of any planes it sold and could not afford to become subject to criticism for selling unsafe planes or liability to damage claims in case of accidents.

General Menoher said it was not expected that any further surplus of army planes would be declared. He estimated that there are now about 2000 planes set aside for army training purposes. He insisted the Government made a good bargain when it sold the surplus planes to the Curtiss company. Asked about the number of inquiries received from prospective private buyers, he said 756 inquiries had come in, 169 of which were from licensed pilots and qualified fliers. General Menoher opposed creation of a separate department of aviation advocated Wednesday by Maj. B. D. Foulois, former chief of the American aviation division abroad.

France Gets 35,000 Tons of Gas Yearly

Supply from Germany Fixed by Peace Treaty—Publish New Prices

PARIS, July 25 (*Staff Correspondence*)—Under the peace treaty, Germany has to supply to France annually 35,000 tons of benzol. The Government Petroleum Committee proposes that this quantity of benzol shall be employed to form a 50 per cent mixture of alcohol-benzol, thus constituting a cheap national fuel for automobile, truck and tractor use.

The price of gasoline was fixed July 1 as follows, for minimum quantities of 13 gallons supplied at Rouen:

First grade gasoline, 75 cents per gallon.

Second grade gasoline, 66 cents per gallon.

Kerosene, 30 cents per gallon.

BETHLEHEM MERGER

ALLENTOWN, PA., Aug. 11—A new corporation has been formed in Delaware to take over the Bethlehem Motor Corp. of this city and the North American Motor Co., Pottstown, Pa. The plan provides for raising $100,000 cash.

Ohio Factories Hum With Full Production

To Build Some 60,000 Cars and 12,000 Trucks in Cleveland This Year

CLEVELAND, Aug. 9—Cleveland has been a large producer of automobiles for several years, but never have the machines been turned out in this city on such a scale as the factories are now sending them into the market.

Never have orders been so numerous. Every factory is working at the peak load and there is too much work for the labor available and for present factory facilities. The market is being scoured for additional employees, big additions to factories are going up and other additions are being planned.

A canvass of the larger automobile factories in Cleveland and talks with the sales managers disclosed that from 55,000 to 65,000 passenger cars and between 11,000 and 12,000 motor trucks will be turned out in this city this year. It is a record for Cleveland, but the future has even better production records in store, according to information just obtained.

Fred H. Caley, manager of the Cleveland Automotive Association, places this city second among the automobile manufacturing cities of the country, Detroit ranking ahead of Cleveland is this respect. But in the manufacture of automobile parts Cleveland is said to have taken the lead.

Rush Cleveland Production

Here are some developments, noteworthy in this field, that have contributed to make this the banner year for Cleveland automobile factories:

Work is being rushed on the new plant of the Cleveland Automobile Co., which produced its first dealer's car last week. The plant, a 4-story structure, 80 x 600 ft., is partly finished and work of assembling cars is going forward. Within ten days it is expected that work will be going forward in a regular way. Despite the late start, company officials say they expect to manufacture 5000 cars this year, which will take care of only a small part of the orders received. As soon s this building is finished work of constructing an extension on the north end of the factory will be started.

Building plans, just announced by the White, Chandler and Grant officials, will greatly increase the capacities of these plants. While the Chandler output this year is expected to reach 20,000 cars, officials state that with present building plans completed the plant will have a capacity of 60,000 cars a year.

The White Motor Co. recently increased its capital from $16,000,000 to $20,000,000 to take care of plant and business expansion. About $750,000 of this increase will be put into new buildings. Plans prepared by the Watson Engineering Co. include extending the parts manufacturing buildings No. 9 and No. 13, located on either side of the administration building out to East 79th Street. The additions to each building will be 85 by 210 ft. and will increase the capacity of each structure about one-third. A new shipping building 150 by 600 ft. is to be erected along the New York Central tracks, while other additions are being contemplated. All of these buildings will be of one-story type conforming to the rest of the plant. There will be a basement under the shipping structure.

Trucks are being produced at the rate of thirty-five to forty a day at the White plant. The capacity of the plant has been given over to the manufacture of trucks, and while the passenger car equipment is at hand it is the present intention of the company to centralize its efforts on truck production for some time to come. About 5500 employees are now engaged—about 800 more than were there at the same time last year.

Chandler Plans Expansion

Construction plans of the Chandler Motor Car Co. include an expenditure of $600,000 or more. Three additional stories are to be added to the building 80 by 400 ft., opposite the main building, that was used for the manufacture of tractors during the war. A 5-story office building 42 x 95 ft. and the extending of an assembling building, which when completed will make a 4-story structure 60 x 900 ft. will give the Chandler plant capacity for 60,000 cars in 1920, according to an official of the company. Last year Chandler made tractors for the government and the passenger car production was cut to 9172.

At the Winton plant operations are progressing on a passenger car production basis of 3000 machines this year. Winton officials recently announced a lower priced car, but the company intends to continue the former standard type and the production of both will be increased to keep pace with the times, officials say. The marine and stationary engine that the Winton Co. started manufacturing in 1912 has shown steady progress and is now being used by several companies. A new factory has been built for making this engine.

Peerless Output Larger

Since control of the Peerless Truck & Motor Co. was returned to Cleveland a few months ago renewed interest in this company has taken place. Capacity has grown rapidly this year and plans are now being made for an output of 5000 cars in 1919. This is somewhat larger than was planned earlier in the year. An addition to the body building plant, entailing an expense of $130,000, is going forward. When completed it will give the company a capacity of 10,000 passenger cars a year. As a result of war contracts, the financial condition of the company has greatly improved. The last statement showed a good liquid condition and it was stated recently that bonds now outstanding amount to only $2,700,000.

(*Continued on page* 347)

English Car Prices Up and Production Slow

LONDON, July 18 (*Special Correspondence*)—The Crossley Four chassis is advanced this week £100 ($500) and the Rolls-Royce 40-50 six chassis is up £125 ($625), being now $7,875. In Birmingham there is a rumor of other makes about to be advanced.

Production is still backward, and in some manufacturing quarters there is no disguising the pessimism prevailing. Meanwhile, the Studebaker Corp. of America is advertising in the leading organs that it is getting in 70 to 100 cars weekly of its allotted (5/12 of 50 per cent of its 1913 import) quantity. The supply will cease by Aug. 10.

Highways Transport Committee Named

WASHINGTON, Aug. 11—The Highways Transport Committee of the Council of National Defense has been appointed to help develop and maintain the highways of the country and to increase transportation resources.

Clifford Shoemaker has been named to represent the Bureau of Public Roads on this committee to succeed J. M. Goodell, who resigned. John W. Halowell, assistant to the Secretary of the Interior, will represent that department, and Lieut-Col. J. M. Ritchie of the Motor Transport Corps is representative of the War Department.

Other members of the committee are: James I. Blakslee, Fourth Assistant Postmaster General, Post Office Department; James H. Collins, Investigator in Market Survey, Bureau of Markets; Dr. R. S. MacElwee, Assistant Director of the Bureau of Foreign and Domestic Commerce, Department of Commerce.

CABLE CODES TO GREAT BRITAIN

LONDON, July 26—The general use of codes (whether published or private) and of abbreviated regi tered addresses, both as addresses and signatures, is again open to all American business men cabling to Great Britain, says the American Chamber of Commerce in London.

The censorship of British controlled cables and wireless telegraphs has been abolished since midnight July 23-24, and with it have gone all restrictions on telegrams to and from the United States and possessions. The postal censorship has been practically discontinued for some time.

MODINE AT MAXIMUM

RACINE, WIS., Aug. 9—The Modine Mfg. Co., Racine, Wis., manufacturer of radiators, is back on a maximum working schedule after having been obliged to reduce production because of labor troubles which now have been settled.

LOYAL TRUCK MOVES

ERIE, PA., Aug. 11—The Loyal Motor Truck Co. has moved to 217-218 Marine Bank Building.

Unfair Competition Charged Against Gas Distributers

WASHINGTON, Aug. 11—The distribution of automatic measuring pumps to gasoline dealers at cut prices, on condition that the dealers will not retail competitive gasoline from the pumps, has been pronounced as unfair competition by the Federal Trade Commission, and 31 interstate distributers of gasoline have been cited in formal complaints alleging unfair competition. The concerns are cited to appear before the commission Sept. 15 with the exception of the Motor Fuel & Lubricating Co., which will appear Sept. 5.

The following concerns are charged with unfair competition:

The Ohio Cities Gas Co., Columbus, Ohio; Maloney Oil & Mfg. Co., Scranton, Pa.; Oklahoma Producing & Refining Corp. of America, Tulsa, Okla.; Sterling Oil Corp., Buffalo, N. Y.; Pavania Oil Co., Warren, Pa.; The Red "C" Oil Mfg. Co., Baltimore, Md.; C. L. Smith Oil & Gasoline Co., St. Louis, Mo.; The Kentucky Independent Oil Co., Covington, Ky.; Kendall Refining Co., Bradford, Pa.; The White Star Oil Co., Eaton, Ohio; The Paragon Refining Co., Toledo, Ohio; Hickok Producing Co., Toledo, Ohio; Gulf Refining Co., Pittsburgh, Pa.; The Columbus Oil Co., Columbus, Ohio; The Carbonless Oil Co., Kenton, Ohio; The Canfield Oil Co., Cleveland; The Factory Oil Co., Akron, Ohio; American Oil & Supply Co., Newark, N. J.; Independent Distributing Co., Columbus, Ohio; The Lilly White Oil Co., Inc., Lima, Ohio; The Springfield Oil Products Co., Inc., Springfield, Ohio; The Lubric Oil Co., Cleveland; Richardson Lubricating Co., Quincy, Ill.; Elmer E. Harris & Co., Buffalo, N. Y.; The Bartles Oil Co., St. Paul, Minn.; Suor Oil Products Corp., Buffalo, N. Y.; Sinclair Refining Co., Chicago, Ill.; Louis Blaustein, Baltimore, Md.; Iowa Oil Co., Dubuque, Iowa; Standard Oil Co. (New Jersey), New York City, and Motor Fuel & Lubricating Co., Baltimore, Md.

OFFICERS PAY LESS FOR GAS

LOUISVILLE, KY., Aug. 8—Officers at Camp Taylor can now buy gasoline for their automobiles at the Camp Commissary for 19 cents a gallon, a drop of 4 cents from the former prices in camp. Civilian motorists in Louisville are compelled to pay 25½ cents a gallon.

ALCOHOL FOR AIRPLANES

WASHINGTON, Aug. 9—Alcohol as a substitute for the high-grade airplane gasoline is being tested by an airmail plane flying from New York. One hundred and thirty gallons of alcohol have been imported here to be used in the experiment.

SERVICE MANAGERS ORGANIZE

NEW YORK, Aug. 11—The newly formed Automotive Association of New York, composed of service managers, for the purpose of co-operating between the industry and owners, with headquarters at the National Automobile Chamber of Commerce, elected the following officers, to hold office until the annual election in January:

R. C. Rognon, Vim Motor Truck Co., president; J. W. Watt, Reo Motor Co., vice-president; J. Howard Pile, Motor World, secretary; E. V. Derks, Buick Motor Co., treasurer. The board of directors includes: E. Hunn, Jr., Packard Motor Car Co.; J. E. Lange, General Motors Corp.; J. M. Grant, White Motor Co.; F. W. Lowe, Ford Motor Co; H. M. Holt, Willys-Overland Co., and Al Rawson, Reo Motor Co.

The constitution and by-laws of the association have been completed, and plans have been laid for monthly meetings, the first of which will be held Sept. 3 at 8 p. m.

More Car Prices Take Upward Bound

SYRACUSE, Aug. 11—Prices of the Franklin have been fixed, under date of Aug. 1, as follows: Touring, $2,750; brougham, $3,700; Sedan, $3,750; 4-passenger roadster, $2,750; 2-passenger roadster, $2,700.

Prices of the brougham and sedan were advanced $200 and of the other three models $100 from those of June 20, when all types were increased $200 over the former prices. Comparison of prices prior to June 20 with those just announced is as follows:

	New Price	Old Price
Touring	$2,750	$2,450
Brougham	3,750	3,350
Sedan	3,750	3,350
4-passenger Roadster	2,750	2,450
2-passenger Roadster	2,750	2,450

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YORK, PA., Aug. 11—An advance of $105 has been made by the Bell Motor Car Co. on its 5-passenger touring and 4-passenger roadster, making the present price $1,250 instead of $1,145.

The company has increased its capital stock from $50,000 to $300,000. It recently equipped a new body and sheet metal plant and is building all its own bodies. The new officers of the company are: Edward Fox, president; G. L. Sintz, vice-president and general manager; Roy S. Fox, secretary, and B. F. Posey, treasurer.

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FLINT, MICH., Aug. 12—The new series of Dort cars are in production. The touring model has preference in manufacture, and the sedan and coupe will be ready in limited quantity this month. The roadster will not come out until fall. Prices, as compared with the 1919 models, are:

Model	New Price	Old Price
5-passenger touring	$985	$925
2-passenger roadster	985	925
5-passenger sedan	1,535	1,355
3-passenger coupe	1,535	1,355

Car Production Was Unchanged in July

August Expected to Reach New Levels—Materials Move Freely

DAILY CAR PRODUCTION IN JULY

Company	July	June
Buick	500	500
Briscoe	75	75
Barley	10	10
Cadillac	70	70
Chalmers	65	60
Chandler	90	100
Chevrolet	730	720
Columbia	30	30
Dodge	375	450
Dort	100	100
Ford	3000	3000
Harroun	...	...
Hudson	110	110
Hupp	75	75
King	15	12
Liberty	40	40
Maxwell	200	200
Oakland	250	265
Olympian	15	12
Oldsmobile	140	140
Overland	200	000
Packard	25	25
Paige	75	75
Paterson	15	15
Jordan	15	15
Maibohm	15	7
Reo	125	125
Saxon	30	30
Scripps-Booth	55	50
Studebaker	165	165
Peerless	12	10
Winton	12	10
Essex	110	110
Grant	40	40
	6784	6649

DETROIT, Aug. 11—Production in Michigan and Ohio automobile factories during July shows but slight variation from June production. In some of the factories, such as Oakland, Saxon and Paige, production was less than during the previous month, owing to the completion of their present line and the commencement of work on new car series. The Ford Motor Co. was closed four days for inventory and for a few days prior to closing full production of 3000 cars daily was not maintained.

Counterbalancing these cuts, however, is Willys-Overland production that averaged better than 200 cars in July. This company did not produce a single machine in June owing to the strike which has been on for three months and which is still in effect.

Now that most of the factories have started production on their new car series, coupled with great improvement in the labor and material situations, the month of August should see new production records attained. Detroit was remarkably free from labor disturbances throughout July. Although the L. A. Young Industries, the Timken-Detroit Axle Co., and a number of foundries have men on strike, these plants are rapidly nearing normal production.

Material is now coming through freely and in greater quantities.

During July, thirty-three factories in the two states ran a daily average of 6784 cars. During June, 6649 cars were turned out daily by the same companies.

May Reduce Engines For the Grand Prix

The 1920 Race Probably Will Run 183 Cu. In. Cars — To Reach Decision Soon

PARIS, July 9 (*Staff Correspondence*)—Conditions of the next French Grand Prix race, to be held probably in July, 1920, will be decided at a meeting of the Sporting Commission of the Automobile Club of France, to be held within the next few weeks. This committee of the French club has not met since 1914.

The trend of the opinion is toward the race for cars having a cylindrical capacity not greater than 3 litres, or 183 cu. in. In 1914, it had been practically decided that the next race would be under such rules. Since then, Indianapolis has set the example by adopting the 183 cu. in. maximum and as numbers of European manufacturers are interested in American races, it is thought the French club will adopt the same rules.

Slight Difference in Measurement

In this connection, it should be pointed out that 183 cu. in. are not exactly equivalent to 3 litres. The difference is slight, but it might be sufficiently important to cause some cars to be eliminated. The French authorities suggest that, as Indianapolis has reduced its limit to 183 cu. in., with the object of coming in line with the French rule, they should adopt the French measurement of 3 litres, this being equivalent to 183.072 cu. in.

It is stated here that, since the Indianapolis rules have been announced, five French firms, and three in Italy and England, have started work on the drawings for 3 litre cars. This had been done on the assumption that the Grand Prix also will be for 3 litre machines.

Discussing this question, Charles Faroux claims that 3 litre racing engines will develop 100 hp. at 3000 r.p.m., and give a speed on the road of 105 m.p.h. This is a better result than was obtained ten years ago with cars of more than 900 cu. in. cylindrical area.

European manufacturers have had considerable experience with 3 litre engines. In 1912 there was a class in the French Grand Prix of cars of not more than 3 litre capacity. In 1914 there were some official races for cars of this size. A race was scheduled the same year for cars of 2½ litres, or 153 cu. in. cylinder capacity. It was never run, but one of the cars that prepared for it went to America and was driven by André Boillot at Indianapolis last May. Running over an ordinary road, the average time being taken in each direction, this little Peugeot covered a kilometre at an average of 96 m.p.h.

Peugeot has just built a two-cylinder engine of 62 by 65 mm. (2.4 x 2.5 in.), which develops 18 hp. at 4000 r.p.m. This corresponds to 11½ hp. per litre of cylinder area. Taking this as a basis, it is calculated that a 4 cylinder of 78 x 166 mm. will develop 27 hp. per cylinder, giving 108 hp. for the engine. This power is obtainable with a mean effective pressure of 9 kilos per sq. cm. This pressure might be slightly increased.

All indications point to the Grand Prix course being selected in either Alsace or Lorraine. In these restored provinces the roads are numerous.

Electric Cars and Trucks At N. Y. Electrical Show

NEW YORK, Aug. 9—Electric passenger cars and trucks, as well as electrical automotive equipment of various kinds, will be on display at the New York Electrical Exposition, to be held at the Grand Central Palace the ten days beginning Sept. 24. Announcement of this feature of the coming show was made to-day.

The Ward Motor Vehicle Co., the Commercial Truck Co. of America and the Walker Electric Vehicle Co. already have secured space in the truck section, and passenger cars are to be shown by the Baker R. & L. New York Corp. and the Metropolitan Detroit Electric Automobile Co.

The Electric Storage Battery Co. and the Philadelphia Storage Battery Co. have arranged for exhibits of their products, and the Bennage Co. will show a new type of electrically heated vulcanizer.

England Arranges Series of Motor Shows

Schedule Includes Exhibitions of Various Kinds Throughout Great Britain

LONDON, ENG., July 26—In addition to the Olympia motor exhibition, Nov. 7-16, the following official shows have been announced:

An exhibition of tractors and agricultural vehicles generally, in connection with the tractor trial at Lincoln, Sept. 24-27.

A Road Transport Congress and exhibition is scheduled for London in November. This exhibition will include all vehicles especially adapted for road making and municipal work.

A Scottish motor exhibition will be held in Glasgow early in January.

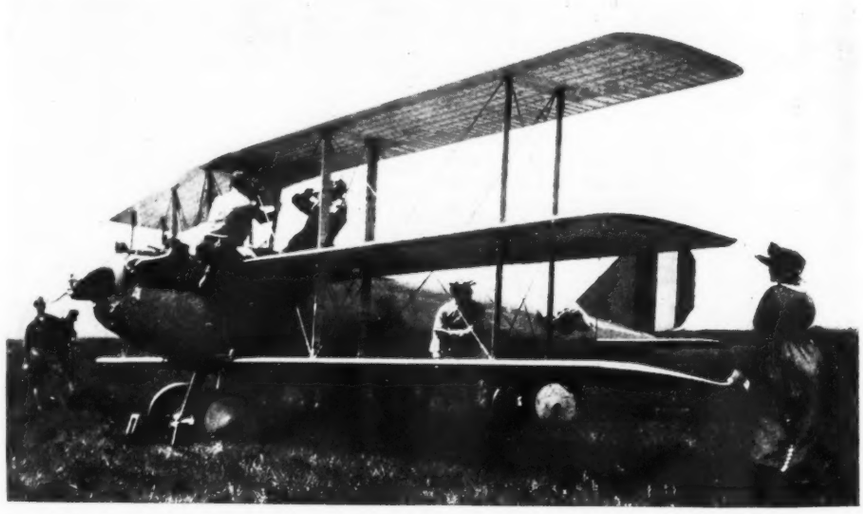
The North of England Motor Exhibition will be held in Manchester early in February.

A commercial vehicles exhibition at Olympia, London, is planned for April or May, 1920.

TITAN FACTORY ADDITIONS

MILWAUKEE, Aug. 9—The Titan Truck Co. has broken ground for a new factory group as an addition to the present works. The building will be 150 x 175 ft., and provide a new machine shop, assembling floor, service station and shipping platform.

THE CURTISS WASP



The Curtiss Wasp shown above is the airplane that was recently piloted by Roland Rohlfs to a new official world's altitude record of 30,700 ft. It is equipped with one of the new Curtiss twelve motors, which has a rating of 400 hp. and which is claimed to be the lightest motor of its power ever built. It has a weight, without oil or water, of 720 lb. and a 4½-in. bore with a 6-in. stroke. The plane has attained a height of 16,000 ft. in 10 minutes and has made a speed record of 160 miles an hour. It has a wing spread of 32 ft. ½ in. and a total supporting surface of 309 sq. ft. Its overall dimensions are width 32 ft., length 23 ft. 3 in. and height 9 ft. 10½ in. The Wasp was designed as a two-seater fighting plane to compete with the small foreign-made scout machines

Many Tractors Enter The British Trials

American Machines Will Compete with English and Italian Models

LONDON, July 18 (*Special Correspondence*)—Entries for the Lincoln tractor trials of the Society of Motor Manufacturers and Traders will close this month. Already 50 machines have been entered for 28 makers. The British tractors to be shown are the Glasgow, Martin, Blackstone, Pick, Santler (a two-way plow), Summerscales (steam), Saunderson & Weeks, Austin, Alldays, Crawley, Omnitractor and Mann (steam).

American entrants are the Moline (new 4-cylinder model), I. H. C. (new 4-cylinder model), Samson Model M, Garner, Fordson, Cletrac, Emerson-Brantingham, Mogul, Overtime, Wallis Cub Jr. and Whiting-Bull.

Tractor attachments and Ford conversion sets will be represented by the Eros. The Italian F. I. A. T. tractor is expected to make its English debut at these trials.

STEWART TRACTOR GETS PLANT

MILWAUKEE, Aug. 11—Plans for the new works which the Stewart Tractor Co. of this city will build at Waupaca, Wis., are nearing completion. The main building will be 80 x 125 ft. and equipped as a machine shop and assembling floor.

STUDEBAKER CO-OPERATIVE PLAN

SOUTH BEND, Aug. 11—Directors of the Studebaker Corp. have approved the co-operative plans previously announced, which include an anniversary check plan applying to all employees; permission for employees to purchase either preferred or common stock of the company; annual vacation of one week with pay to all employees of two years' service; pension and insurance plans.

Rev. Dr. Charles A. Lippincott has been appointed manager of the Co-operative Department.

The company has issued a booklet on "Studebaker Co-operative Plans," explaining the scheme, and is distributing it to all employees.

Labor Conference Provided by Peace Treaty in Fall

WASHINGTON, Aug. 11—The first Annual Labor Conference provided for in the peace treaty will be held in Washington on Oct. 29. The peace treaty provides for an annual conference of representatives of the members of the League of Nations.

The meeting is to be composed of four representatives of each member, of whom two will be Government delegates and two will be delegates representing the employers and workers. The section also provides for the establishment of an International Labor Office at the seat of the League of Nations as a part of its organization, composed of twenty-four persons representing governments, the employers, and the workers.

APPEAL FOR WIRE WHEEL SUIT

NEW YORK, Aug. 12—An appeal will at once be filed from the decision by the Court of the Southern District of New York, Second Circuit, holding invalid the patent to Pugh, 1,047,702, covering the triple spoke lacing employed by the Wire Wheel Corp. of America, and its licensees, the Standard Roller Bearing Co., the Hayes Wheel Co. and the Dayton Wire Wheel Co. This decision will not cause any change in the policy of the Wire Wheel Corp. to establish the validity and stop the infringement of its principal patents.

In addition to the prosecution of a suit against the Budd Wheel Co. which involves other patents owned by the Wire Wheel Corp., its legal staff is actively engaged in preparing for the further litigation that this policy renders necessary.

MINERAL OIL EXPORTS

WASHINGTON, Aug. 12—The following statement of exports of mineral oils from the United States was compiled by the Bureau of Foreign and Domestic Commerce:

	June				Twelve Months Ended June			
	1919		1918		1919		1918	
	Gallons	Value	Gallons	Value	Gallons	Value	Gallons	Value
Crude mineral oil	10,687,741	$577,192	23,697,244	$1,346,301	163,782,498	$9,905,490	185,069,674	$9,288,979
Illuminating oil	122,419,897	14,358,693	31,929,708	3,188,636	722,129,836	80,964,925	528,217,669	47,261,782
Lubricating oil	25,074,829	7,705,953	23,990,930	6,468,097	274,780,451	86,311,726	269,673,770	66,162,117
Gasoline, naphtha, etc	31,702,238	7,664,655	12,099,289	48,962,811	116,734,306	468,184,573	469,909,599	114,382,086
Residuum, fuel oil, etc	56,090,065	3,153,423	95,688,593	5,278,457	902,383,426	50,696,662	1,224,165,516	61,234,087
Total	245,974,770	$33,459,916	224,269,286	$28,380,780	2,531,260,784	$344,613,109	2,677,036,228	$298,329,051

Want Car Embargo Lifted In Britain

Meetings Are Being Held by Business Men Against License Evil

LONDON, July 18 (*Special Correspondence*)—An interesting movement, mainly in the Liberal Party, is afoot to compel the Government to remove the embargo on certain imports, including motor cars, at the earliest moment. Meetings have been organized and are being held in the chief centers of industry and at London.

At a meeting just held in the Central Hall of the Cannon Street Station, London, the chief speaker was Sir John Simon, a Liberal ex-Minister and a leading lawyer. The tone of the meeting which, so far as could be judged, was non-political, was one of patience sorely tried and the resolution demanding the immediate removal of all embargoes upon imports was carried whole heartedly.

The thing which business men find hardest to bear just now is the policy of selection, which the present "hunt" for licenses entails. As Sir John Simon said, such a policy obviously divides traders into two camps: those who require imports on the restricted list and are fortunate enough to obtain licenses, and others whose need is equal, but whose success in making application is not so complete. The speaker analyzed the position from various standpoints, business and economical, and also gave a closely reasoned opinion of its constitutional and legal aspects.

The impression one gained from the meeting, which represented interests up and down the country as well as in the city, was that, while business men accepted control as a necessary evil during the war, they are convinced that its continuance is responsible for the prevalence of high prices, and are, therefore, unwilling to submit further to legislation that hampers them.

USE FOR AIR MOTORS

WASHINGTON, Aug. 9—Second-hand airplane engines are said to have proved most reliable and economical as stationary power units, such as motor boat engines, driving pumping apparatus, etc., according to experiments made by Great Britain. By making an alteration in the carbureter, it is possible to run the engines on coal gas and, with couplings made from shells, they have been connected to dynamos with excellent results.

AEROMOBILE CORP. INCORPORATED

DOVER, DEL., Aug. 9—The Safety Aeromobile Corp. has been incorporated to manufacture and sell airplanes and other mechanical devices, with a capital stock of $5,000,000, by H. A. Van Bingham, Oradell, N. J.; R. A. Van Vorhis, Jersey City, and A. R. Oakley, Pearl River, N. Y.

Willys Forms Large Holding Company

All Subsidiaries in Corporation —To Build Six-Cylinder Car

TOLEDO, Aug. 11—The Willys Corp., capitalized at $50,000,000, has been incorporated as a holding company for all of the John N. Willys holdings in concerns not including the Willys-Overland Co. In this connection, the stockholders of the Willys-Overland Co. have been called for a special meeting, Aug. 14, to consider action upon a proposed contract between the Overland and the Willys Corp. for the manufacture of a new 6-cylinder car recently developed by the Willys-Overland Co.

Necessary plants for the manufacture of the Willys Six have been purchased at Elizabeth, N. J. It was stated also that the Willys-Lite plant systems, which it had been rumored would be manufactured at Poughkeepsie, N. Y., will be made here.

Clarence A. Earl, vice-president of the Willys-Overland Co., stated that his company has perfected a new 6-cylinder car but cannot manufacture it owing to the limited facilities of the plant here. At Elyria, Ohio, a large engine manufacturing unit will be built, 160 acres of land having been purchased as a site for the proposed plant It will be one of the largest in the world. Just when work will start was not given out. For the present, however, additions will be built to the present Elyria factory to handle the increased production demands.

At the Willys-Overland plant at Toledo, labor conditions are rapidly improving. There are now more than 9000 men on the pay-roll. During July, 5574 automobiles were turned out. The average number of cars completed and made ready for shipment between July 14 and July 31 was 218.

Subsidiary corporations of the Willys-Overland Co. are listed as the Curtiss Aeroplane & Motor Corp.; the Moline Plow Co.; Willys-Overland, Inc., of Canada; the New Process Gear Corp. of Syracuse, N. Y.; the Willys Morrow Co. of Elmira, N. Y.; the Wilson Foundry & Machine Co. of Pontiac, Mich., and the Budd Wheel Corp. of Philadelphia.

New Overland Four Price To Be $845

TOLEDO, OHIO, Aug. 9—Announcement is expected here shortly by Willys-Overland, Inc., that the new Overland Four, advance notices of which have been current for some time, will be sold at $845. The present selling price of the Overland Model 90 is $985.

OHIO BLOWER PLANT

CLEVELAND, Aug. 11—Contracts have been let and work started on a $200,000 addition to the Ohio Blower Co.'s plant. The building will be L-shaped, 110 x 60 x 160 ft., four stories high, of reinforced concrete. It is expected to be completed within 90 days, and will be used for the manufacture of automobile bodies.

Study of Fuel Quality Asked by Car Makers

Gasoline Should Be Standardized or Engines Adapted to Steadily Decreasing Quality

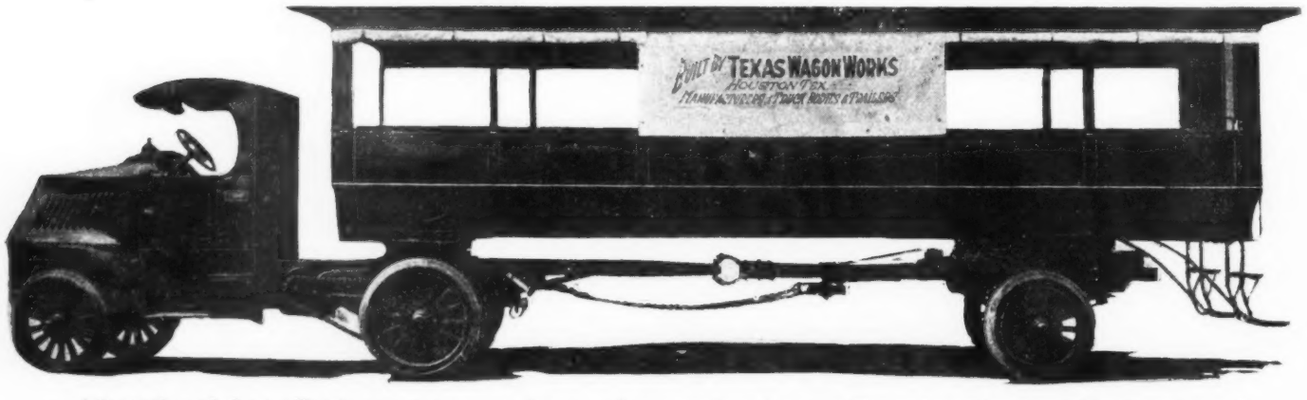
DETROIT, Aug. 11—Detroit automobile manufacturers may ask gasoline producers to fix a certain limitation on the quality of automobile fuel. Representatives of the Detroit automobile manufacturing plants composing the Automotive Fuel Club are making a study of the situation, which they declare is serious.

For the producer to properly prepare gasoline before putting it on the market would mean a curtailment in the production and an increase in price. The engineers, however, are convinced that either the grade of gasoline must be standardized and test up to a certain specific gravity or the manufacturer must continue his costly experience in engine design necessary to meet the steady decreasing quality of fuel.

Figures submitted show that in the last 3 years gasoline for motor fuels has decreased in gravity from 60.5 to 55 and the end point has reached from 300 to 455 Fahr. During the 3 years one factory alone has received seven different grades.

Reports from various oil companies give the impression that the low grade of gasoline marketed is due to the fact that less of it is being obtained from crude oil and, consequently, more blending with kerosene is necessary.

Truck-Trailer That Carries 100 Passengers



Adaptation of the trailer to passenger carrying on a large scale, where trolley and railroad service do not meet requirements, is illustrated in the above picture of a bus operated for its employees by the Texas Oil Co. at Morgan, La. The body has a seating capacity of eighty, and will carry 100 persons. It is mounted on a semi-trailer, measuring 25 ft. in length, 8 ft. in width and 6 ft. in height. The interior has four longitudinal seats. The trailer and body were built by the Texas Wagon Co., of Houston, Tex., and are drawn by a Mack short-wheelbase tractor. The rear wheels and axle turn under the body like the front wheels of a wagon, and are connected by an extension pipe pole under the center of the body through a universal joint with a corresponding pole from the tractor so that all of the trailer wheels track with the rear wheels of the tractor. This permits the outfit to make short turns without cutting corners and to be used wherever space permits the tractor to go. It can be backed like an ordinary truck. The rear end of the tractor is fitted with a tilting fifth wheel which carries the front end of the body. Swinging bolsters support the body near its two ends. Draft or pull of the tractor is through two chains fastened to the side members of the tractor frame and to a singletree attached to the pipe pole under the body. This brings the draft at the lowest possible point without placing it directly on the axle. When turning corners, the length of the chains is equalized through sliding clips on the singletree to which the ends of the chains are attached

Suffer Loss With Single Deck Bus

LONDON, July 18 (*Special Correspondence*)—It has often been suggested to employ single deck motor busses in London, as a means of reducing the weight and maintenance costs, the latter gain being sought by mounting them on pneumatic tires, as is the case in Paris.

In consequence of the present-day traffic pressure in the metropolitan area and the shortage of normal type or double-deck motor-busses, the London General Omnibus Co. recently adapted 168 army transport lorries as single-deck busses. The result, however, has been unfortunate from the earnings point of view, there being an average loss of 5d. (ten cents) per mile or 30s. ($6) per week per vehicle. The total loss, therefore, is more than £1,500 ($7,500) a week.

The London General Omnibus Co. is rapidly adding to its normal type of bus, and shortly will be placing a new type on the streets. Reports state that it will be at least 1000 lb. lighter than the present type and will have a larger carrying capacity.

500,000 BBL. OIL BOUGHT

WASHINGTON, Aug. 11—The United States Shipping Board has contracted with the Mexican Petroleum Corp. for 500,000 bbl. of grade "C" oil fuel at $1.18 per barrel, delivered at St. Thomas, West Indies.

PARKER ADDS 5-TON TRUCK

MILWAUKEE, Aug. 8—The addition of a 5-ton model completes the Parker line, which now includes trucks of 2, 3½ and 5-ton load capacities. The new model has been designed to operate economically under severe service conditions.

The 4¾ x 6 in. Continental engine is of low speed type with cylinders cast in pairs. Lubrication is by gear pump which forces oil through a drilled crankshaft to the main bearings. A centrifugal pump of large size circulates the cooling water. The built-up type radiator has a vertical tube core. Ignition is by Bosch magneto and the Stromberg carbureter is fuel-fed from a Stewart vacuum tank.

A multiple disk Brown-Lipe clutch is fitted and the gearset is mounted amidships. The latter is a Warner 4-speed job. The drive-shaft is of seamless steel tubing, 1¾ in. in diameter and is fitted with two Thermoid universal joints. Propulsion is taken through radius rods and torque is through the springs. The rear axle is of Timken make and worm type and Smith cast steel wheels are regular equipment. Wheelbase is either 160 or 180 in. Chassis price is $5,225.

Exports of Automobile Tires from United States for June, 1919

Countries	Value	Countries	Value
Austria-Hungary	....	Dominican Republic	9,030
Belgium	$21,173	Argentina	470,123
Denmark	113,699	Bolivia	1,082
Finland	....	Brazil	32,637
France	192,628	Chile	163,966
Greece	8,303	Colombia	9,925
Italy	414	Ecuador	9,547
Netherlands	34,895	British Guiana	1,788
Norway	104,504	Paraguay	64
Portugal	800	Peru	23,309
Roumania	570	Uruguay	10,438
Russia in Europe	....	Venezuela	22,654
Serbia, Montenegro, etc	200	Aden	....
Spain	104,160	China	....
Sweden	189,370	British China	28,417
Switzerland	....	Japanese China	1,000
Turkey in Europe	....	Chosen	175
England	143,718	British India	35,085
Scotland	....	Straits Settlements	56,730
Ireland	....	Other British East Indies	5,251
Bermuda	....	Dutch East Indies	28,907
British Honduras	554	French East Indies	4,466
Canada	158,293	Hongkong	16,009
Costa Rica	678	Japan	57,052
Guatemala	3,423	Russia in Asia	262,263
Honduras	1,491	Siam	549
Nicaragua	1,857	Australia	126,071
Panama	39,517	New Zealand	131,145
Salvador	4,668	Other British Oceania	....
Mexico	74,879	French Oceania	611
Miquelon, Langley, etc	....	German Oceania	545
Newfoundland and Labrador	1,606	Philippine Islands	335,952
Barbados	520	Belgian Kongo	....
Jamaica	10,897	British West Africa	204
Trinidad and Tobago	1,497		28,588
Other British West Indies	1,569	British East Africa	4,988
Cuba	97,390	French Africa	656
Danish West Indies	875	Italian Africa	....
Dutch West Indies	1,198	Portuguese Africa	....
French West Indies	21,273	Egypt	11,101
Haiti	6,477	Total	$3,236,424

Three Makers Form New Organization

Four-Wheel Drive and Jackson Companies Combine in Large Corporation

JACKSON, MICH., Aug. 8—A $5,000,000 passenger car and truck company has been formed here through the merger the Jackson Motor & Manufacturing Co., Jackson Automobile Co., and the Four-Wheel Drive Truck Corp., of Chicago and Port Jefferson, L. I. The new company will be known as the Jackson Motors Corp. It will manufacture both cars and trucks, planning to produce during the next 12 months 4000 automobiles and 1200 four-wheel-drive trucks of 3½-ton capacity.

The concern will occupy the present plant of the Jackson Automobile Co., and will employ about 1000 men. The proposed passenger car to be turned out will be of the 6-cylinder type. The company is now operating on a contract with the General Motors Corp. to finish 10,000 coupé and sedan bodies involving a production of 40 bodies daily.

The officers of the new organization are: President, H. A Matthews, Jackson, Mich; vice-president, W. W. Sterling, Boston; secretary, Carl L. V. Exselsen, Chicago; treasurer, F. O. Evans, Chicago. The board of directors is composed of C. O. Minger, president and general manager of the Electric Auto Light Corp., and vice-president of the Willys-Overland Co., Toledo, Ohio; F. E. Mosher, secretary and general manager of the Covert Gear Co., Lockport, N. Y.; G. W. Rogers, Goodyear Tire & Rubber Co., Akron, Ohio; Chrispon Oglebay, president and general manager of the Ferry Machine & Foundry Co., Cleveland; H. A. Matthews, formerly president of the Jackson Automobile Co.; W. W. Sterling, real-estate financier and manufacturer, Boston; Carl L. V. Exselsen, of the law firm of Exselsen, Peacock & Wollesen, Chicago, and president and general manager of the Portage Silica Products Co., Portage, Wis.; F. O. Evans, former secretary and general sales manager of the Story & Clark Piano Co., now president and general manager of the Evans Art Piano Co., Chicago, Ill., and F. C. Mathews, former secretary and general superintendent of the Jackson Automobile Co.

The machinery and all equipment of the Four-Wheel Drive Truck Corp. plants at Chicago and Long Island have been shipped to the Jackson Automobile plant. Both plants have been completely dismantled and Jackson will be the main home of the organization.

The Jackson Automobile Co., discontinued the manufacture of its passenger car at the outbreak of the war and went into munition work. After the armistice the passenger car was not taken up, the company devoting itself to preparing for truck production only. The first completed machines will soon be placed on the market.

U.S. Rubber Plans Huge Stock Increase

Directors Approve Total of $300.-000,000—Ask Higher Dividend on Common

NEW YORK, Aug. 8—A large increase in the capitalization of the United States Rubber Co. was voted here yesterday by the board of directors as a recommendation to the stockholders for action. The announced plan contemplates the authorization of common and preferred stock to a total of $300,000,000, against which the present authorization is $120,-000,000, and that now issued and outstanding being $99,425,700.

The new totals will be composed of $100,000,000 in first preferred and $200,-000,000 in common stock, with a retirement of the entire issue of second preferred, which has been largely acquired by the company. The present status of stock is as follows:

	Authorized	Issued
First preferred	$70,000,000	$63,022,100
Second preferred	10,000,000	403,600
Common	40,000,000	36,000,000

Chairman Offers Recommendation

The recommendation, which was made by Samuel P. Colt, chairman of the board, also included declaration of a dividend of 8 per cent per annum beginning in October. Also, the directors approved the recommendation that an extra distribution, either in stock or in cash, "such as may be warranted under all conditions," be made early in 1920 to the holders of common stock.

The stockholders are to be called together at New Brunswick, N. J., on Sept. 9 to consider the proposals, which further contemplate the issuance and offer at par of $36,000,000 of additional common stock to the present holders of the common issues, to provide additional working capital without the application of so large a proportion of earnings as has been used the past few years.

The increased authorizations are based upon the present and past business of the company, for the past five years, which is given as follows:

1914	$83,000,000
1915	92,000,000
1916	126,000,000
1917	176,000,000
1918	215,000,000

Chairman Colt's recommendation set forth the following:

"During that period, the capital stock has remained substantially the same. The indebtedness of the company was funded in 1917 into long term 5 per cent bonds.

"The surplus earnings for the years 1917 and 1918 were equivalent each year to about 30 per cent on the common stock, and the earnings for the first half of 1919 have been substantially the same as the first half of 1918. For the past two years your company has been unable to meet the demand for its tires, and notwithstanding its capacity has already been substantially increased. Further construction has been authorized which will require in the neighborhood of $15,000,000 for its completion, and which will double the present capacity of the company.

"The amount of present outstanding common stock compared with the property of the company is relatively small.

"In view of these conditions, your chairman would recommend, upon the Certificate of Organization being amended as proposed, that $36,000,000 of additional common stock be issued and offered to our common stockholders at par, in order to provide ample capital to meet the enlarged business of the company without the application of so large a proportion of earnings for that purpose as has been done the past few years.

"Your chairman is also of opinion that the company is now amply justified in placing its common stock upon an 8 per cent dividend basis and he would, therefore, recommend that dividends at the rate of 8 per cent per annum be paid upon the common stock of the company beginning October next, and further, that an extra distribution, either in stock or in cash, such as may be warranted under all conditions, be made early in 1920 to common stockholders."

The new issue of $36,000,000 already had been underwritten by a New York banking firm that will receive a compensation of two per cent. That announcement was made by Chairman Colt in a statement to stockholders.

The money will be used for four purposes, the statement sets forth. They are:

To pay off all current indebtedness that can be paid.

For new construction planned and in progress, designed principally for the increase of the production of automobile and truck tires.

For the extension of rubber plantations in the East.

For facilitating the carrying of stock under profit sharing for the benefit of the company's employees.

Net earnings for the first six months of the year, after deducting all interest charges, and allowing for depreciation, Federal taxes and reserves, were $10,815,-750, according to an announcement by W. G. Parsons, comptroller of the company. This is equivalent to $16.26 a share on the now outstanding common stock after the deduction of first and second preferred dividends. This is at a rate of $32.52 annually on the common stock outstanding, against $30.86 in 1918.

The consolidated balance sheet, as of June 30, also was made public, and reveals total assets of $284,462,061, made up as follows:

Cash	$8,865,780
Accounts and notes receivable	38,773,310
Manufactured goods and material	87,374,033
Securities, including Liberty bonds	7,130,577
Property, plants and investments, including rubber plantations	140 644,792
Prepaid and deferred assets	1,673,568

Total current liabilities were placed at $30,784,226 and total liabilities, excluding reserves and capital, at $98,591,226. Current assets at the end of June show as being $135,013,135, which gives the company a net working capital of $104,-228,898. At the end of 1918 the consolidated balance sheet showed the net working capital as $93,727,007, while at the end of December, 1917, it was $83,-927,586.

Call September Meet of Accessory Makers

NEW YORK, Aug. 9—The annual credit managers' convention of the Motor and Accessory Manufacturers' Association has been set for Sept. 11 and 12, at the Hotel Lafayette, Buffalo, N. Y. That announcement was made today by M. L. Heminway, general manager of the association, who has in charge the arrangements for the meeting.

It is planned to make the two-day conference almost national in scope and, in view of the subjects to be discussed, is expected to draw attendance from all of the membership, despite the fact that the annual national convention will not be held until the winter. Special discussions, headed by leading manufacturers and men prominent in the industry, are to be held, with the problems under consideration those of passenger cars, trucks, tractors, labor and highway construction. C. E. Thompson, the president of the association, who also is president of the Steel Products Co., of Cleveland, will preside.

"The trade is confronted with such serious problems that it is advisable for all members to meet at this time," Heminway said.

Tractor Engine Exports During June, 1919

Countries	Gasoline Number	Gasoline Value	Steam Number	Steam Value
Belgium	7	$8,485	..	....
Denmark	35	58,318	..	....
Finland	5	6,800	..	....
France	665	772,270	22	$24,710
Greece	1	750	..	....
Italy	34	39,329	..	....
Netherlands	2	3,200	..	....
Norway	8	11,325	7	9,725
Portugal	9	26,223	..	....
Roumania	65	52,700	77	34,703
Spain	7	7,402	..	....
Sweden	102	69,791	..	....
England	35	18,340	50	47,500
Canada	176	160,729	4	4,392
Honduras	..	....	3	5,400
Panama	1	1,150	..	....
Mexico	6	8,118	7	7,450
Barbados	1	903	..	....
Cuba	49	66,783	..	....
Haiti	5	4,000	..	....
Argentina	62	15,198	..	....
Chile	14	11,200	..	....
Ecuador	1	1,100	..	....
British Guiana	1	5,300	..	....
Peru	88	61,451	..	....
Uruguay	1	1,564	..	....
China	1	6,825	..	....
British India	16	21,344	..	....
Straits Settlements	13	10,492	..	....
Dutch East Indies	13	24,158	..	....
French East Indies	2	1,552	..	....
Japan	3	18,135	..	....
Australia	66	69,156	..	....
New Zealand	1	1,390	..	....
Philippine Islands	66	92,490	17	47,580
British So. Africa	25	15.182	..	....
Egypt	2	3,374	..	....
Total	1,588	$1,676,527	187	$181,460

Name New Heads For All-American

CHICAGO, Aug. 11—Paul Klein-exel was elected president and general manager of the All-American Truck Co. at a recent directors' meeting, replacing R. H. Spear, resigned. Otto Bruenauer was made vice-president in charge of sales and engineering, and R. J. Sutton, vice-president in charge of manufacturing.

Klein-exel was founder and organizer of the All-American company and during its development to the present position he has acted as chairman of the board of directors.

Bruenauer, who also replaces Spear on the board of directors, has had wide experience in the engineering and sales end of the automotive industry for a great many years past, having but recently resigned from the U. S. Ball Bearing Co., following changes of personnel of that organization attendant upon the death of W. H. Strom.

In preparation for the occupancy of the new factory now under construction and in consequence of the increase in production made possible thereby, E. A. Paepper, chief engineer in the Mercedes some years ago and later with Mercer and Republic, becomes chief engineer of the All-American.

H. H. Howe, formerly with the Maxwell organization, becomes the active head of the sales department immediately under Bruenauer with the title of sales manager. W. Mann, formerly with Republic, has also been brought to Chicago in the capacity of purchasing agent.

The increase in sales for the All-American truck not only has made necessary the construction of the new factory, but, in addition, a very material increase of both the inside and field force of salesmen is now in progress. The country is being divided into zones in charge of direct factory representatives, who in turn are installing their own separate organizations down even to the employment of associated dealers in the smaller towns.

SALE OF CALCIUM CARBIDE

WASHINGTON, Aug. 9—The Director of Sales announces that the Surplus Property Division of the Office of the Director of Purchase and Storage, War Department, is offering for sale under sealed proposals 620,000 lb. of calcium carbide, located at the Ben Hur Plant, Willoughby, Ohio, bids for which will be opened at 10 a. m., Aug. 26, by the Surplus Property Officer, Zone Supply Office, 1819 West 39th Street, Chicago.

This surplus material used commercially for making acetylene gas is the product of the Union Carbide Co., and is packed in its standard cans of approximately 100 lb. per can. Inspection of the material may be made by applying to the Surplus Property Officer prior to the date of sale.

No bids for less than a minimum carload will be accepted and bond, certified check or other satisfactory security amounting to 10 per cent of the total bid must accompany each proposal. Particulars and special bid forms can be secured from the Surplus Property Officer, Zone Supply Office, in any of the following cities: Boston, New York, Philadelphia, Baltimore, Newport News, Atlanta, Chicago, San Antonio, Jeffersonville, Ind., Omaha, St. Louis, El Paso, New Orleans and San Francisco.

Grant Workers Are Insured by Company

CLEVELAND, Aug. 9—In line with a policy of protection for its workers, group insurance has been taken out by the Grant Motor Car Corp., here, for all of the company's employees who have been on the rolls for three months. The policies embrace life, accident and health insurance.

The insurance starts when a man or woman has been in the employ of the company for three months, and begins with a minimum of $500, increasing automatically $100 for each six months additional service for five years, so that the maximum benefit is eventually $1,500. All those who have been in the employ of the company already for five years or longer will have $1,500 insurance at once.

In the event of disablement through accident or disease, employees receive a stated amount per week for 26 weeks.

GERMAN ZEPPELINS FOR U. S.

WASHINGTON, Aug. 9—That a number of Zeppelin airships may be turned over to the United States is now considered possible by officials here, who believe that the United States will share in the distribution of Zeppelins held under the armistice terms.

These ships have an easy sailing capacity of 8000 miles and it is said are far in advance of any dirigibles that the United States could make for some time. There are twenty-four first class Zeppelins in Berlin which the German government desires to ship to the United States for sale here, and which the American government states cannot be sold in this country until peace is officially declared.

BREAKS FLIGHT RECORD

WASHINGTON, Aug. 9—From Washington to New York in 75 min. is the new non-stop speed record established yesterday by Col. H. B. Claggett in an Army DeHaviland plane. The flight of 210 miles was made at an altitude of 4000 ft. and an average of 168 miles an hour. The previous speed record between Washington and New York was 84 min.

TRUCK TRAIN IN WYOMING

WASHINGTON, Aug. 9—The Motor Transport Corps transcontinental truck train reached Cheyenne, Wyo., to-day, where it was met by the Governor and his party. The train found the highways chiefly of sand and gravel, well crowned and compact. There were no mechanical troubles.

Ohio Factories Hum With Full Production

(*Continued from page* 340)

The Grant Motor Corp. will build plant additions which will permit double production or the manufacture of 20,000 automobiles next year. For this purpose the company has offered to old stockholders the unissued amount of its common stock that at the offering price would net $648,450. When subscriptions were figured up the amount secured totaled $1,000,000 or an over-subscription of more than 50 per cent. The stock was offered directly by the company.

Grant Earns $1,000,000

As a result of this sale of common stock and the recent sale of $500,000 serial 6 per cent notes and with cash on hand the company now has $1,500,000 of funds not being used in the business and which will go at once into new production. While no statement has been made regarding earnings, it is unofficially said the company expects to make better than $1,000,000 annually on the new production now formulated.

The company has let contracts for two additional stories to its present buildings and has plans completed for the production of a new car, the details of which will be given out later. The car, it is understood, will have a longer wheelbase and generally featured by new body lines.

The F. B. Stearns Co. is producing cars on the basis of about 4500 a year and expects to increase this to some 7000 cars in 1920. A building program totaling about $300,000 is soon to be started. This will give the company a modern 4-story building fronting 400 ft. on Euclid Avenue and running 450 ft. along Lake View road and to the Nickel Plate railroad.

Refinancing of the Jordan Motor Car Co. was necessary this year to take care of a building program that will triple the former capacity of the plant and efforts are being made to increase production at the rate of from 10 to 30 cars a day. This year's production is estimated between 5000 to 7000 machines.

Officials of the Baker R. & L. Co. report that they are getting back to a normal business and that about 700 electric passenger cars and as many electric industrial trucks will be built this year. In addition, orders for enclosed bodies have been received that will keep the plant busy this year and next.

Templar Enlarges Plant

The Templar Motor Car Co. is increasing its plant and building up its passenger car business. H. W. Anderson, sales manager, states that about 1800 cars will be built this year and plans for a 10,000 production in 1920 are being made. Anderson states that the company has about six acres under roof and plans are being drawn for additional buildings. One of the plants just finished is the enameling building.

Former Aviation Officers Design New Light Car

DETROIT, Aug. 9—Sidney Waldon, formerly vice-president of the Packard Motor Car Co., and later colonel in the Aviation Section, and E. H. Sherbondy, former experimental engineer of the Air Service, have taken an office in Detroit, where they are designing a lightweight car embodying many advanced engineering ideas. It is not expected that the car will be on the market until next summer, as considerable experimental work will be done with the preliminary model.

H. O. Vanderhoef has been promoted to general sales manager of the hard rubber and electric storage battery jar department of the Brunswick-Balke-Collender Co., Chicago.

William P. Anderson has joined the executive staff of the Olds Motor Works, Lansing, as assistant general manager. He comes here from the Wright-Martin Aircraft Corp., New Brunswick, N. J., where he was general factory manager.

A. E. Wilkins, who resigned as general superintendent of the Ann Arbor Machine Co., Ann Arbor, Mich., is in the engineering department of the Reo Motor Car Co.

Leo Burnett, advertising manager of the Cadillac Motor Car Co., has resigned to join D. McCall White, who is designing an automobile for manufacture.

N. W. Meyer is now sales manager of the Neville Steering Wheel Co., Detroit. He was formerly with the Bradfield Co., which handles the advertising of the Neville Co.

R. C. Getsinger, former sales manager of the Saxon Motor Car Corp., has just been appointed sales manager of the Lincoln Motor Car Co.

Bert Lusk, for many years in the truck specification department of the Packard Motor Car Co., is now connected with the truck department of the Packard Motor Car Co., Pittsburgh.

W. E. Armacost, former factory manager of the Victor Tire & Rubber Co., has been selected as general manager of the Columbus Tire & Rubber Co., Columbus, Ohio; recently organized and soon to start production in a new plant.

W. G. Fitzgerald, formerly Kentucky representative of the Mohawk Rubber Co., Akron, now has charge of the San Francisco branch of the company.

J. H. Jackson, formerly production engineer for the Sharples Separator Co., West Chester, Pa., and recently discharged from army service as lieutenant, has been made sales manager of the Pittsburgh Gear & Machine Co., Pittsburgh, Pa., succeeding W. H. Thompson.

C. M. French, for many years with the Portage Rubber Co., has been appointed credit manager of the Owen Tire & Rubber Co., Bedford, Ohio.

Men of the Industry

Changes in Personnel and Position

Fred. Wellman has been appointed advertising manager of the National Motor Car & Vehicle Corp., Indianapolis, so succeed Lucius French, who resigned to become secretary of the Western Oil Refining Co., also of Indianapolis.

Wellman has been associated with Carl G. Fisher of Prest-O-Lite for the last four or five years. He was also connected with the Olds Motor Works for a year prior to the return of W. C. Durant to control in the General Motors Corp. He assumed his new duties Aug. 1.

E. R. Gardner, who has been sales manager of the truck department of the Velie Motors Corp. for the last two years, has been appointed sales manager of both truck and passenger car departments. Charles R. Gardner, sales manager of the passenger car department for the last two years, has resigned to become general manager of the Security Motor Co. of Omaha, Velie distributer for Omaha and vicinity.

George W. Daum has been elected assistant general manager to Seneca G. Lewis, vice-president and general manager of the Pennsylvania Rubber Co. H. Wilfred DuPuy, president and treasurer, has relinquished his position of treasurer to A. H. Price.

J. A. Massie, for several years sales manager of the Hoyt Electrical Instrument Works, Penacook, N. H., has retired from active service with the company, but will retain his interest in the Burton-Rogers Co., which has been made the sales department for the concern, with M. T. Rogers taking over Mr. Massie's duties. Mr. Massie will take a rest for some time.

Charles W. Carr has been appointed manager of the Cleveland branch of The Goodyear Tire & Rubber Co. He has been city salesman for the Goodyear for four years and succeeds Fred L. Morgan, who has been called to the home office in Akron, where he will assume departmental management.

Sam J. Turnes, advertising manager of the Brunswick-Balke-Collender Co., Chicago, becomes general sales manager of the tire department, to succeed John W. Maguire, who resigned.

C. G. Sinsabaugh has been appointed referee for the Elgin Races, Chicago, Aug. 22 and 23.

A. L. Ditter, who was formerly sales manager for the Field Mfg. Co., Owosso, Mich., has been promoted to general sales manager.

HERCULES NEW SALES POLICY

CANTON, OHIO, Aug. 11—The truck and tractor interests of the Hercules Motor Mfg. Co. have been divided into four districts, each under the supervision of a district sales manager. The eastern or Atlantic district, covering New England, New York, New Jersey, Pennsylvania, Delaware, Maryland and the eastern coast, will be in charge of E. H. Geyer, with headquarters at Buffalo, N. Y. The central district, with headquarters at Detroit, comprising Ohio, Indiana, Michigan, Kentucky, Tennessee, Alabama, Arkansas and Texas, will be in charge of D. I. Cooke.

Allen Kendall will represent the midwest district with headquarters at Chicago, which takes in Illinois, Wisconsin, Minnesota, Missouri, Nebraska, Kansas and the Dakotas.

The Pacific Coast territory, covering the territory west of the Rocky Mountains, with headquarters at San Francisco, will be under George McMullen.

DENIES OTHER CONNECTIONS

RACINE, WIS., Aug. 12—The J. I. Case Threshing Machine Co. has issued a statement denying any interest or connection with J. I. Case Plow Works or the Wallace Tractor Co. of this city, or the J. I. Case Plow Co. recently incorporated in Delaware.

BUICK CARBURETER CORP.

DETROIT, Aug. 11—David Buick, T. D. Buick and W. R. Buick have formed the Buick Carbureter Corp. with a capital of $3,000,000.

V. M. Smith has been appointed general superintendent of the Supreme Motors Corp., Warren, Ohio. He was formerly with the Hudson Motor Car Co. and previous to that was general superintendent of the Continental Motors Corp. and assistant superintendent of the Mercer Automobile Co.

William L. Krapp, general sales manager of the Turnbull Motor Truck & Wagon Co., Defiance, Ohio, has resigned. The sales department is temporarily in charge of B. H. Smith, Indianapolis, Ind., one of its factory representatives. No one has yet been named for the position.

Arthur B. Reynders has been made works manager of the East Springfield plant of the Westinghouse Electric & Mfg. Co. He has been with the company since 1899 and since 1912 has been director of production. A. E. Kaiser, who has been Mr. Reynders' assistant since 1912, has been appointed to succeed him as director of production.

F. J. Beama, who was former district representative for the Parry Manufacturing Co., Indianapolis, has been appointed sales manager for the Field Manufacturing Co., with headquarters at Owosso, Mich.

DETROIT, Aug. 11 — The Sewell Cushion Wheel Co. will open branches on the Pacific Coast at San Francisco, Portland, Ore., and Seattle, Wash.

TIRE COMPANIES COMBINE

ASHTABULA, OHIO, Aug. 9—Announcement is made that the Pearce Tire & Rubber Co., of Ashtabula, has been consolidated with the Ideal Tire & Rubber Co. of Cleveland. The business at both plants will be conducted under the name of the Ideal Tire & Rubber Co. and it is expected to produce about 2000 tires daily. The combined capital is $5,000,000.

MONITOR ADDS PLANT

COLUMBUS, OHIO, Aug. 9—The Monitor Motor Car Co. has purchased the plant of the Scioto Rubber Co. and will occupy it after Sept. 1. The new plant has a floor space of 72,000 sq. ft., giving needed additional space. Production will be continued at the present plant on Mt. Vernon Avenue until machinery is installed in the new plant.

ENGINE COMPANY SUES UNIONS

WATERLOO, IOWA, Aug. 9—The Waterloo Gas Engine Co., tractor builder, this week started suit for $400,000 damages against the International Machinists Union, its organizers, officials and members. The suit is founded on the famous Danbury hatters' case and alleges breach of contract, as the union employees recently went on strike. In addition to breach of contract, the Waterloo Gas Engine Co. alleges conspiracy to unionize the factory, change hours and terms of labor, and working conditions.

STRIKE IN ENGINE PLANT

MILWAUKEE, Aug. 11—The Wisconsin Motor Mfg. Co. experienced its second strike in less than two months on Thursday. About half the force walked out June 29 to enforce a demand for a 10 per cent wage increase. On July 1 the company granted a 5 per cent increase and the men returned to work. Now they are striking for another 5 per cent raise.

DART MEN ON STRIKE

WATERLOO, IOWA, Aug. 9—Employees of the Dart Truck & Tractor Corp. joined in the general strike among the local manufacturing concerns, having failed to come to agreement with officials of the company.

FIAT ENTERS CANADA

TORONTO, Aug. 9—Offices have been opened here by Elmo de Paoli as Canadian representative of the Fiat Motors Co., of Turin, Italy. Paoli was a lieutenant in the artillery corps of the Italian army. He will establish sales agencies throughout this country.

NEW HOME FOR DETROIT CO.

DETROIT, Aug. 9—The Detroit Trailer Co. has moved into its new factory building recently erected at 27-37 Jos. Campau Avenue, where it has increased manufacturing facilities.

Current News of Factories

Notes of New Plants—Old Ones Enlarged

BRISCOE DEVICES IN NEW PLANT

PONTIAC, MICH., Aug. 11—The Briscoe Devices Co., formerly known as the Jackson Carbureter Co., has evacuated its plant at Jackson, Mich., removing the factory to its new plant at 212-214 Osman Street, this city. It has a capacity for greatly increased production.

Production has been resumed on carbureters for installation on Ford, Briscoe, Maxwell and Dort cars, and other models will be added as fast as possible.

CANADIAN PLANT FOR CARR

HAMILTON, ONT., Aug. 11—The Canadian plant of the Carr Fastener Co., Boston, Mass., will be built here. It will be known as the Canadian Carr Fastener Co. The company makes metal fasteners, including dome fasteners for automobile curtains. A site of two and a half acres here was purchased from the Petrie Manufacturing Co. Building operations will start within the next month. Production will be entered upon before the end of the year.

IOWA TIRE FACTORY CHARTERED

SIOUX CITY, IOWA, Aug. 9—The Zonta Tire and Rubber Co. was incorporated here this week with a capital stock of $1,500,000 and announced that a factory will be started Oct. 1 and that by April 1 the plant will produce tires and tubes. A tract of land, 200 by 400 ft., has been bought on the Floyd River, adjoining the plant of the Hawkeye Truck Co. The incorporators are A. K. Kilburn, Hugh A. Ritchie, H. W. Caldwell and T. P. Scott.

EXPORT FIRM CHANGES NAME

NEW YORK, Aug. 9—The China & Japan Trading Co., Ltd., announced today that it had changed its name to the China, Japan & South America Trading Co., Ltd. The policy and personnel are unchanged.

DIVIDENDS DECLARED

The Haynes Automobile Co., Kokomo, Ind., quarterly dividend of 1¾ per cent upon the preferred stock, to be paid on Sept. 1, 1919, to stockholders of record Aug. 20.

Owen Tire & Rubber Co., Cleveland, 7 per cent dividend on preferred stock has been declared. It is the initial one to be declared by this company and is payable on September to stockholders of record Aug. 15.

Stewart Motor Corp., Buffalo, N. Y., a quarterly dividend of 2 per cent on preferred and 2½ per cent on common stock.

Mutual Motors Equipment On Way to Tonawanda

JACKSON, MICH., Aug. 9—Removal of the Mutual Motors Co. from Jackson to Tonawanda, N. Y., is now under way. About 75 per cent of the equipment of the plant and store parts are on the way East. It is expected that the moving work will be completed by Aug. 15. The company ended its operations here one year ago. At a receiver's sale the equipment of the plant and the store of parts were purchased by Buffalo, N. Y., capitalists. The company manufactured the Marion Handley, Marion and Imperial cars. The company will conduct a service station in Jackson.

MONARCH TRACTOR REFINANCED

WATERTOWN, WIS., Aug. 9—The Monarch Tractor Co., a South Dakota corporation which recently acquired a plant at Paulsboro, N. J., and established a Canadian works at Brantford, Ont., is effecting a reorganization with greatly increased capital to be more adequately financed for large operations.

OGREN TO MAKE NEW CAR

MILWAUKEE, Aug. 9—The Ogren Motor Car Co., recently incorporated here with $500,000 capital, will build a factory to manufacture the Ogren passenger car, designed by Hugo W. Ogren of Chicago, a former racing driver, who has been marketing the design on a small scale out of Chicago for some time. Details are not ready to be divulged.

COLLINS TO MAKE CARS

ALBANY, N. Y., Aug. 9—The Collins Motors, Inc., was incorporated this week to make passenger cars. Its general offices and factory will be at Huntington, L. I., and sales and export offices will be in New York City. A four acre factory site has been purchased and a modern plant of steel and glass will be erected at once.

The company capitalized for $400,000 with the following directors and officers: Albert H. Collins, president, Detroit, Mich.; William B. Brewster, vice-president, New York City; Spencer C. Smith, treasurer, East Orange, N. J.; Charles H. Stoll, secretary and general counsel, New York City, and Henry S. Brush, Huntington, L. I.

NEW TIRE CONCERN

MILWAUKEE, Aug. 11—The Acme Tire & Rubber Co. has been organized with an authorized capital stock of $100,000 to manufacture pneumatic fabric and cord casings and tubes for motor vehicles. Alvin M. Carter, Andrew Loell, Sr., and John M. Carter are incorporators.

GRAVES HAS ADDITION

SPRINGBORO, PA., Aug. 9—L. C. Graves Co., Inc., manufacturer of commercial car and truck bodies, has just completed an addition to its plant which will increase production 50 per cent.

Calendar

SHOWS

Aug. 23-Oct. 6—Toronto, Can. Cars, Trucks and Tractors, Airplanes and Motor Boats in conjunction with Canadian National Exhibition.
Sept. 13-20—Cincinnati, O. Ninth Annual, Music Hall, Cincinnati Automobile Dealers' Assn., H. K. Shockley, Manager.
Sept. 15-20—Springfield, Mass. Eastern States Exposition.
Sept. 24-Oct. 4—New York, N.Y. New York Electrical Show, Grand Central Palace.
October—Ft. Dodge, Ia. Fall Motor Show, District Fair Grounds.
Oct. 6-11—Detroit, Mich. Closed Car Show, Arena Gardens. Detroit Auto Dealers' Assn., H. H. Shuart, Mgr.
*Oct. 9-19—Paris. Grand Palais, International Automobile Mfrs. Congress.
Oct. 16-23—New York. Automobile Salon, Hotel Commodore.
November—Christchurch, N. Z. First National Motor.
Nov. 3-8—Chicago, Ill. Business Exhibit of Automotive equipment Assn., Medinah Temple.
Nov. 7-16—London. Olympia Motor Car Exhibition—Society of Motor Mfrs. and Trades.
December — Brussels. International Automobile Mfrs. Congress.
January—New York. International Automobile Mfrs. Congress.
January — Glasgow, Scotland. Scottish Motor Exhibition.
Jan. 3-10—New York, N. Y. Grand Central Palace, National Automobile Chamber of Commerce, S. A. Miles, Manager.
Jan. 24-31—Chicago, Ill. Coliseum, Cars; Drexel Pavilion, Trucks; National Automobile Chamber of Commerce. S. A. Miles, Manager.
February — Manchester, Eng. North of England Motor Exhibition.
February—Chicago. International Automobile Mfrs. Congress.
Feb. 23-March 6—Birmingham, Eng. British Industries Fair.
March—London, Eng. Motor Boat, Marine and Stationary Engine Exhibition.
April or May—London, Eng. Commercial Vehicles Exhibition, Olympia.

AUTOMOTIVE SHOWS AT FAIRS

Aug. 9-16—Sedalia, Mo. Tractors, Missouri State Fair. Kansas City Tractor Club.
Aug. 20-29—Des Moines, Ia. Machinery Hall.
Aug. 26-29—Madison, Wis. Cars, trucks and tractors, accessories, Dane County Fair, Madison Assn. of Commerce.
Aug. 26-29—Columbus, O. Cars and tractors. E. V. Walborn, Manager.
Aug. 29—Detroit. Second Motor Show, Michigan State Fair.
Aug. 30-Sept. 6—Minnesota State Fair.
Aug. 31-Sept. 5—Lincoln, Neb. Cars, trucks and tractors. E. R. Danielson, Supt. of Concessions.
Sept. 1-5—Hartford, Conn. Connecticut Fair Assn.
Sept. 1-5—Wheeling, W. Va. Cars, trucks and tractors.
Sept. 1-6—Indianapolis, Ind. State Fair. Cars and Accessories, Indianapolis Automobile Trade Assn., John B. Orman, Manager.
Sept. 1-6—Rochester, N. Y. Automobile Club of Rochester. E. F. Edwards, Manager.
Sept. 1-6—Spokane, Wash. Cars, trucks and tractors.
Sept. 8-13—Helena, Mont. Cars, trucks and tractors.
Sept. 8-13—Milwaukee, Wis. Milwaukee Automobile Dealers, Inc., Bart J. Ruddle, Manager.
Sept. 8-13—Syracuse, N. Y. Cars, trucks and tractors.
Sept. 8-13—Topeka, Kan. Cars, trucks and tractors, Motor Hall and Machinery Field.
Sept. 9-13—Douglas, Wyo. Cars, trucks and tractors.
Sept. 12-20—Peoria, Ill. Cars, trucks and tractors.
Sept. 13-20—Hutchinson, Kan. Cars, trucks and tractors.
Sept. 14-20—Sioux City, Ia. Cars, trucks and tractors.
Sept. 15-20 — Springfield, Mass. Cars, trucks and tractors O. A. Nash, Asst. Gen. Manager.
Sept. 15-20—Yakima, Wash. Cars, trucks and tractors.
Sept. 16-19—Billings, Mont. Cars, trucks and tractors.
Sept. 20-27—Oklahoma City, Okla. Cars, trucks and tractors. J. S. Malone, General Manager.
Sept. 20-27—Memphis, Tenn. Cars, trucks and tractors.
Sept. 22-27—Allentown, Pa. Lehigh County Agricultural Assn.
Sept. 22-27—Pueblo, Col. Cars, trucks and tractors. J. L. Beaman, Manager.
Sept. 22-27—Salem, Ore. Cars, trucks and tractors. Dealers' Motor Car Assn., M. O. Wilkins, Manager.
Sept. 24-Oct. 4—Kansas City, Kan. Cars, trucks and tractors.
Sept. 29-Oct. 4—Meridian, Miss. Cars and tractors. A. H. George, General Manager.
Sept. 29-Oct. 4 — Chattanooga. Tenn. Chattanooga Auto Dealers' Assn.
Sept. 29-Oct. 4—Muskogee, Okla. Cars, trucks and tractors.
Sept. 30-Oct. 3—Brockton, Mass. Cars.
Sept. 30-Oct. 4—Lancaster, Pa. Lancaster Fair Assn.
October—Columbia, S. C. Columbia Automobile Dealers' Assn.
Oct. 6-19—Dallas, Tex. Cars, Trucks and Tractors, Texas State Fair.
Oct. 20-25—Raleigh, N. C. Cars, trucks and tractors.
Oct. 22-27—Shreveport, La. Cars, trucks and tractors.

TRACTOR SHOWS

August—Harrisburg. Cars, tractors, trucks, automotive equipment. J. Clyde Myton, Mgr.
Aug. 19-21 — Aberdeen, S. D. Tractors, Tractor Accessories and Farm Lighting Plants. Aberdeen Commercial Club.
Aug. 19-22—Toledo, O. Lucas County Fair. H. B. Marks, Mgr.
Aug. 21-22—Butler, Pa. State Demonstration under auspices of State College, manufacturers and distributers.
Aug. 26-28—Rockford, Ill. County Fair.
Aug. 26-30—Wausaw, Pa. Marathon County Fair.
Sept. 1-6—Greenville, S. C. Agricultural Implements and Tractors. F. M. Burnett, General Manager.
Sept. 8-13—Huron, S. D. Cars, tractors, trucks, automotive equipment. C. N. McIlvane, Mgr.
September—Los Angeles, Cal. Regional Tractor Demonstration under the auspices of the National Implement & Vehicle Assn.
Sept. 9-12—Streator, Ill. Northern Illinois Tractor & Truck Assn.
Sept. 15-20—Allentown, Pa. Lehigh County Agricultural Assn.
Sept. 22-28—Waterloo, Ia. Automobile show, in connection with Waterloo Dairy Cattle Congress; Black Hawk County Motor Trades Bureau, G. V. Orr, Secretary.
Sept. 24-27—London, Eng. Society of Motor Mfrs. & Traders, Ltd.
Oct. 14-16—Ottawa, Ont., Can. Interprovincial Plowing Match and Tractor Demonstration.
Nov. 22-29—Jacksonville, Fla. Florida State Fair and Exposition. B. K. Hanafourde, Mgr.
February — Kansas City, Mo. Fifth Annual Kansas City Tractor Club, Guy H. Hall, Manager.
Feb. 9-14—Wichita, Kan. Tractor and Farm Machinery, Forum, Wichita Thresher-Tractor Club.

CONTESTS

*Aug. 15 — Middletown, N. Y. Dirt track event.
Aug. 23—Elgin, Ill. 308 Mile road race.
Sept. 1—Uniontown, Pa. Speedway race.
Sept. 20—Sheepshead Bay, L. I. Speedway race.
Sept. 27—Allentown, Pa. Dirt track event.
Oct. 4—Trenton, N. J. Dirt track event.
Oct. 11—Cincinnati, O. Speedway race.
Oct. 11—Danbury, Conn. Dirt track event.
*Nov. 27—Los Angeles, Cal. Ascot Speedway Race.

*Tentative dates.

CONVENTIONS

Aug. 13-19—Wrightsville, N. C. Twelfth Annual Convention State Assn. County Commissioners; 29th Annual North Carolina Good Roads Assn.; First Annual N. C. Auto Assn.
Sept. 11-12—Buffalo, N. Y. Annual Credit Manufacturers' Canvention, Motor and Accessory Mfrs.' Assn., Hotel Lafayette.
Sept. 22-24—Philadelphia. Annual Convention, National Association of Purchasing Agents. Bellevue-Stratford.
Oct. 1—Denver, Col. Directors' Meeting, National Automobile Dealers' Assn.
Oct. 9-10—Jackson, Miss. Second Annual Convention, Louisiana - Mississippi Assn.
Oct. 14-17—Atlantic City, N. J. Twenty-fifth Annual Convention, Marlborough-Blenheim, National Hardware Association of the United States.
Oct. 29—Washington, D. C. Annual Labor Conference provided by Peace Treaty.
November—London, Eng. Road Transport Congress and Exhibition.
Nov. 3-8—Chicago, Ill. Convention, Automotive Equipment Assn., Medinah Temple.
January, 1920—Washington. Pan-American conference.
Feb. 9-13—Louisville, Ky. Seventeenth Annual Convention American Road Builders' Assn.; Tenth American Good Roads Congress and Eleventh National Good Roads Show.
May 15-20, 1920—San Francisco. Seventh National Foreign Trade Convention.

Openings for Trade in Foreign Countries

WASHINGTON, Aug. 12—The Bureau of Foreign and Domestic Commerce, Department of Commerce, has received requests for automobiles or parts agencies of business from individuals and companies in foreign countries. These are listed below. For further information address the Bureau of Foreign and Domestic Commerce and specify the Foreign Trade Opportunity number.

South Africa—Two 2-seater airplanes. Fullest possible details as to price, horsepower of engine, load capacity, range of travel without descent, etc., wanted. Quotations should be given f.o.b. steamer in New York. Terms, cash or bank guarantee. An agency is also desired. 30171.

Brazil—Representation of American steamship companies and agencies for the sale of automobile tires, motorcycles and automobiles. Correspondence may be in English. 30157.

Syria—15 automobiles, 20 to 35 hp.; 5 at $700 to $800; 5 at $1,250 to $1,500, and 5 at $1,750 to $2,000; and accessories and spare parts sufficient to stock an automobile repair and equipment shop. Quotations c.i.f. Syria should be given. Terms, cash against documents in New York. 30183.

Algeria—Automobiles, motor trucks and tractors. Quotations should be given c.i.f. Algeria. Payment, cash against documents. Correspondence should be in French. 30217.

Algeria—Tractors, and motor cars. Quotations should be given c.i.f. Algeria. Payment against documents. Correspondence should be in French. 30221.

India—Cars quotations should be given c.i.f. English port. Correspondence may be in English. Reference. 30,000. An agency for the sale of motor accessories is desired in England. Reference. 30004.